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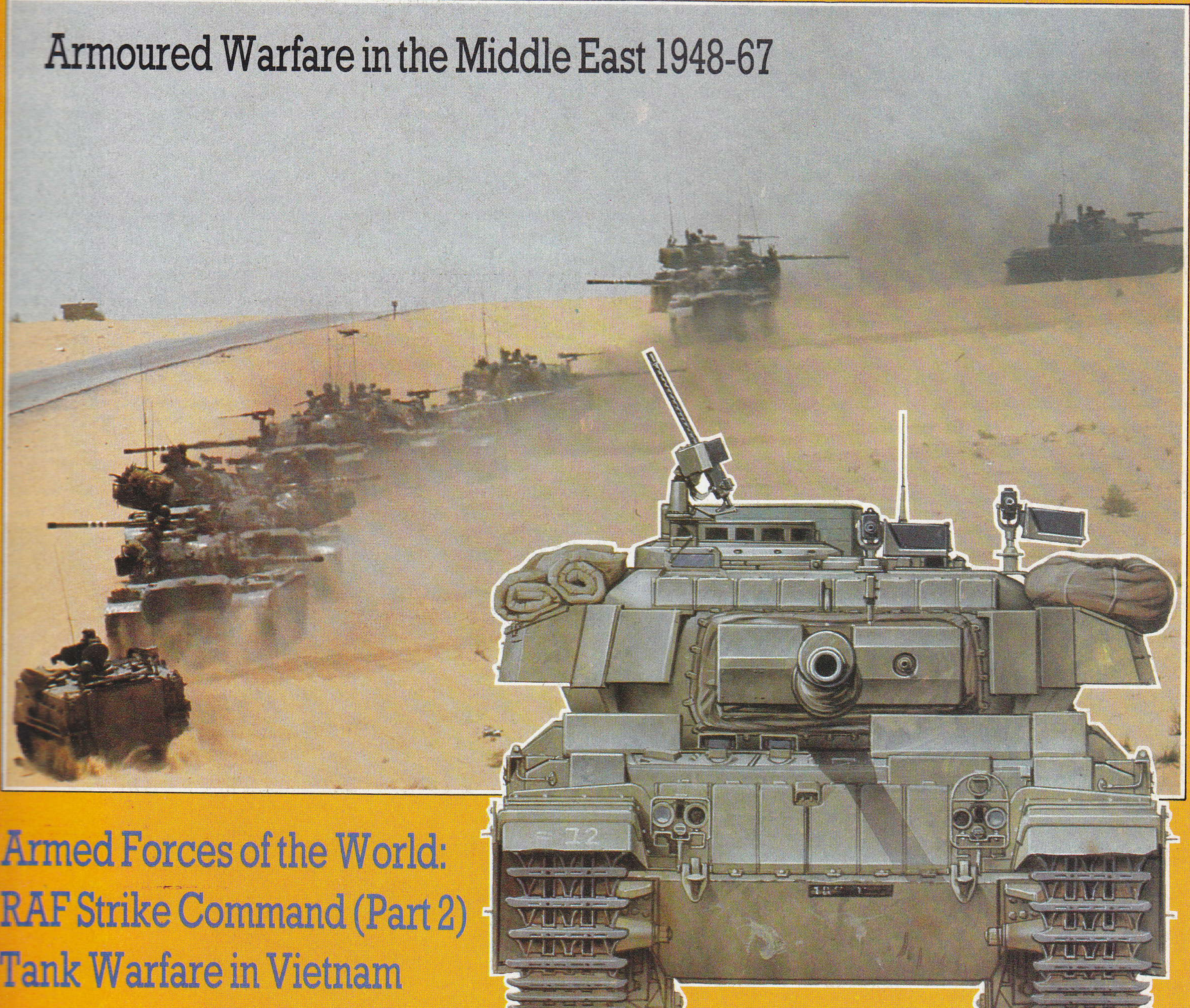
Armoured Warfare in the Middle East 1948-67



Armed Forces of the World: RAF Strike Command (Part 2)

Tank Warfare in Vietnam

Centurion in Action

An illustrated guide to Armoured Vehicles of the 1950s and 1960s

WAR MACHINE

Volume 2 **Issue 13**

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Self-propelled Guns and Howitzers
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Battleships of World War II
Machine-guns of World War II

Armoured Vehicles of the 1950s and 1960s

In service with Israel for 20 years, the British-designed Centurion was developed at the end of World War II, and by continuous modification has remained effective right up to the present day.

At the end of World War II the tank stood out as one of the prime weapons in the new mobile warfare. Great efforts were made to develop new families of armoured vehicles, and the 1950s saw the introduction of the first crude anti-tank guided weapons. Development was to such effect that many vehicles in use in the 1980s are designs of the 1950s or earlier.

World War II proved that tanks had a major role to play on the battlefield, and in the USA some of the projects still under way at the end of the war were continued, though many others were cancelled. A considerable amount of work was done on automotive components such as engines and transmissions, as well as on the main armament. This effort was put to good use at the outbreak of the Korean War, and within a short time the USA was able to place in production a whole range of armoured vehicles including the M41 light tank, M47/M48 medium tank and M103 heavy tank, as well as numerous self-propelled guns, APCs and other specialized vehicles. Many of these vehicles were ordered even before prototypes were completed, and the result was that many of these had later to be rebuilt, a very expensive and time-consuming process. Since then the USA has taken care to test thoroughly its armoured vehicles before placing them in production.

In the UK a complete family of vehicles ranging from tanks to self-propelled guns was conceived, but many of these did not reach the production stage and the most successful British tank of this period, the Centurion, can trace its development back to World War II.

France also started an AFV development programme in the immediate post-war period with the EBR armoured car and AMX-13 light tank, both unusual designs. The latter has been exported all over the world and remains in production to this day, as do many of its specialized variants such as troop carriers and self-propelled guns.

In the mid-1950s armoured development again started in Japan and West Germany, with production vehicles following in the 1960s. Switzerland and Sweden also undertook the design and later production of tanks in this period, the Swedish S-tank being one of the most unusual vehicles of its type.

The USSR continued to design, develop and place in production tanks after World War II. On a one-for-one basis these were generally inferior to their Western counterparts, but they were cheap and easy to manufacture, maintain and operate, all factors which have led to their export on a wide scale to most parts of the world.

During the 1950s the first anti-tank guided missiles appeared. These were very basic compared to the systems in use today, but they did provide the basis on which more effective systems could be designed and built, and their introduction in both vehicle- and man-portable versions has changed the face of the battlefield, once again compelling tank designers to place greater emphasis on armour protection.

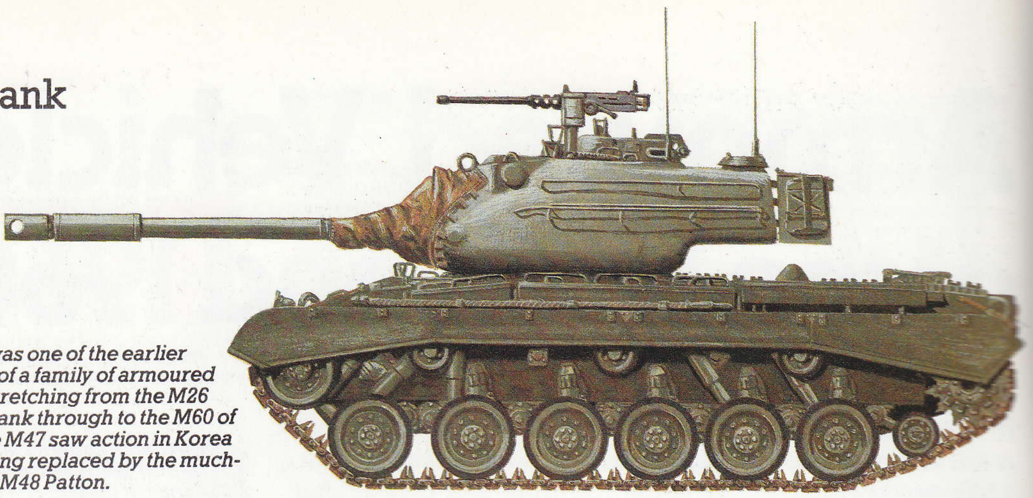
It must also be remembered that many of the vehicles in service today, and in some cases still in production, can trace their development back to the mid-1950s, or in some cases even earlier.

Some of the vehicles described have now disappeared from service as their chassis could not be adopted to carry new weapon systems, while others (for example the M48 and Centurion tanks) have been constantly updated to enable them to remain viable weapon systems for the foreseeable future.

One of the features of Middle East warfare has been the frequency with which captured weapons have been turned against their former owners. Here we see an Egyptian Centurion, captured from Israel in 1973.

USA

M48A3 Main Battle Tank



The M47 was one of the earlier members of a family of armoured vehicles stretching from the M26 Pershing tank through to the M60 of today. The M47 saw action in Korea before being replaced by the much-improved M48 Patton.

When the Korean War broke out in 1950, the USA had no medium tanks in production. As an interim measure the turret of the T43 medium tank then under development was put onto the chassis of the M46A1 tank and this entered production as the M47, well over 8,000 being built. The M47 has long been phased out of US Army service but remains in service with many countries including Greece, Italy, Spain, Pakistan and Portugal, to name but a few. Design work on a new medium tank, also armed with a 90-mm gun, started in the early 1950s under the designation **T48**, and this was ordered into production even before the first prototypes had been completed. The first production vehicles were completed at the Delaware Tank Plant, operated by the Chrysler Corporation, in July 1952, when the widow of General George Patton christened the type **Patton**. With such a short development period, which was justified by the international situation at that time, there were many problems with the early M48s, including poor reliability and a very short operating range of only 70 miles (113 km). The M48 was followed by the **M48A1**, **M48A2** and finally **M48A3**. The last had many modifications as a result of problems with the earlier vehicles, and was powered by a Teledyne Continental AVDS-1790-2A diesel which increased the operational range of the tank to some 288 miles (463 km).

Production of the M48 series continued until 1959, by which time over 11,700 had been built. The M48 was succeeded in production by the M60 series, which itself is a further development of the M48. The M48 is still used by many countries around the world including Greece, Iran, Israel, Jordan, South Korea, Lebanon, Morocco, Norway, Pakistan, Portugal, Somalia, Spain, Taiwan, Thailand, Tunisia, Turkey, the USA and West Germany.

The M48, M48A1, M48A2 and M48A3 are all armed with a 90-mm gun, with a 7.62-mm (0.3-in) machine-gun mounted co-axially with the main armament and a 0.5-in (12.7-mm) machine-gun mounted in the commander's cupola. To extend the type's operational life, the **M48A5** was developed in the mid-1970s. This is essentially any one of the earlier models rebuilt and fitted with a 105-mm M68 gun (as fitted to the M60 series), a 7.62-mm (0.3-in) M60D machine-gun on the turret roof, a new powerpack and many other detailed modifications. From 1975 Anniston Army Depot converted well over 2,000 of the older M48 series MBTs to the M48A5 configuration, and apart from two battalions in Korea these are all deployed in the USA. The United States has also supplied many countries with kits to enable them to convert their existing stocks of M48s to M48A5 standard. The West German company Wegmann has converted some 650 M48A2 tanks into the **M48A2GA2** version for the West German army. These have the British 105-mm L7A3 gun, new ammunition racks, new commander's cupola, passive night-vision equipment, Wegmann smoke dischargers and modifications to the fire-control system.

The automotive components of the M48 were also used in the **M88** ARV and the **M53** and **M55** self-propelled artillery weapons. Variants of the M48 include the **M67, M67A1** and **M67A2** flamethrower tanks (none of which are at present in front-line service) and the **M48** AVLB which is widely used in the US Army and has a scissors bridge launched over the front of the vehicle. The chassis is also being used for the new **M247 Sgt York** Division Air Defence System (DIVADS), the first production examples of which should come off the production line in late 1983. This has a new turret armed with twin 40-mm Bofors guns and a comprehensive fire-control system which will be able to engage low flying aircraft and helicopters. Over 600 of these are expected to be procured by the US Army to provide each division with one battalion of DIVADS vehicles.

The M48 series has seen combat with the United States and Vietnamese armies in South Vietnam, with the Pakistani army against India, and with the Israeli army against Jordan, Egypt and Syria. It has now proved to be a reliable tank, and when fitted with the 105-mm L7A3 or M68 gun can counter most tanks likely to be encountered on the battlefield today, especially when firing the new types of APFSDS-T ammunition developed by the United States, Israel and the United Kingdom.

M48A2 of the US Army with commander's and loader's hatch in the open position. By late 1983 the US Army still had over 2,000 of these vehicles on strength.

Specification

Crew: 4

Weight: 47.17 tonnes

Engine: Continental AVDS-1790-2A 12-cylinder diesel developing 750 bhp (560 kW)

Dimensions: length (with gun forward) 8.686 m (28 ft 6 in); length (hull) 6.882 m (22 ft 7 in); width 3.631 m (11 ft 11 in); height 3.124 m (10 ft 3 in)

Performance: maximum road speed 48.2 km/h (30 mph); maximum range 463 m (288 miles)); fording 1.219 m (4 ft 0 in); gradient 60%; vertical obstacle 0.915 m (3 ft 0 in); trench 2.59 m (8 ft 6 in)

An early production M60 tank crosses a pontoon bridge. The M60 was virtually an upgunned M48 with an improved engine; it was quickly replaced by the M60A1, which had a completely redesigned turret.

USA

M50 Ontos tank destroyer

In the early 1950s the US Marine Corps issued a requirement for a highly mobile tank destroyer, and in October 1951 authorization was given for the building of no less than five prototype vehicles, all of which had various numbers of recoilless rifles as their main armament. These were built and tested, and in February 1953 approval was given for the procurement of 24 models of the **T165** which was armed with six 106-mm recoilless rifles. Trials with the first of these vehicles showed that some work was required with the mounting, fire-control system and suspension. The remaining vehicles were built to a slightly modified design and designated the **T165E2.** Following trials with the latter vehicles, and more modifications, the vehicle was finally accepted for service with the US Marine Corps and in 1955 was standardized as the Rifle, **Multiple, 106-mm Self-Propelled, M50** or, as it was normally called, the **Ontos** (Greek for The Thing). In August 1955 Allis Chalmers was awarded a production contract for 297 vehicles, which were all completed by November 1957. At a later date it was decided to replace the original General Motors petrol engine with a Chrysler petrol engine developing 180 hp (134 kW) and subsequently, in June 1963, the original manufacturer was awarded a contract to rebuild 294 M50 vehicles to the new configuration known as **M50A1**; at the same time a number of other minor improvements were made to the vehicle. The M50 was used in South Vietnam and in the Dominican Republic, but it has now been retired from service with the US Marine Corps without a direct replacement, although ground- and vehicle-mounted TOW ATGWs carry out a similar function.

The vehicle was armed with six M40A1C recoilless rifles mounted on a common mount at the rear of the hull. These had a traverse of 40° left and right with an elevation of +20° and a depression of −10°, elevation and traverse all being manual. The top four recoilless rifles were fitted with a 12.7-mm (0.5-in) M8C spotting rifle: the weapons were first lined up with the optical sight and the spotting rifle was then fired, a hit on the target being indicated by a puff of smoke, whereupon the gunner knew that the recoilless rifle was correctly aligned with the target. One or more of the recoilless rifles could be fired, maximum effective range being about 1100 m (1,200 yards) although maximum range was over 7000 m (7,655 yards). The ammunition was of the fixed type and included HEAT (High Explosive Anti-Tank) and HEP-T (High Explosive Plastic-Tracer), the latter type being known as HESH in British service. Totals of 18 rounds of 106-mm and 80 rounds of spotting ammunition were carried. In addition an M1919A4 7.62-mm (0.3-in) machine-gun was fitted to the top of the mount for local protection.

The driver was seated at the front of the hull on the left, with the engine to his right and the very cramped crew compartment at the rear; entry to the latter was effected via two doors in the hull rear. The engine was coupled to a General Motors Corporation (Allison Division) XT-90-2 cross drive transmission that transmitted power to the drive sprockets at the front of the hull.

The chassis was also used for a number of experimental vehicles but none of these, including several armoured/infantry carriers, entered production or service.

Specification

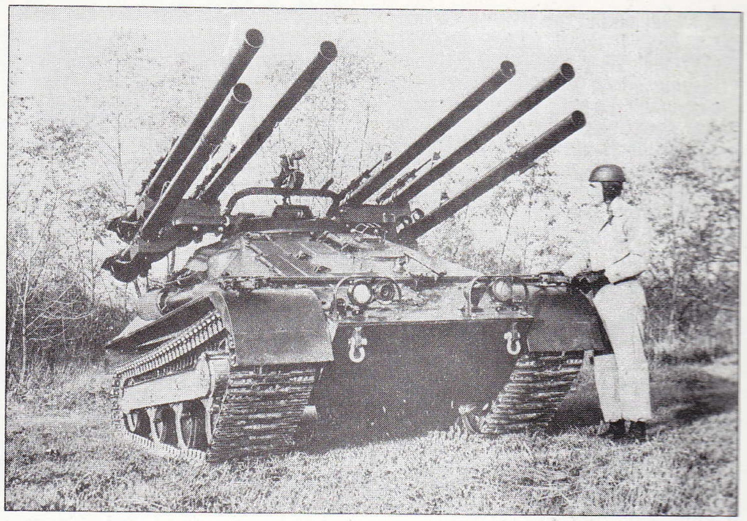
Crew: 3

Weight: 8.64 tonnes

Dimensions: length 3.82 m (12 ft 6⅜ in); width 2.60 m (8 ft 6¼ in); height 2.13 m (6 ft 11⅞ in)

Powerplant: one General Motors Corporation Model 302 petrol engine developing 145 hp (108 kW)

Performance: maximum road speed 48 km/h (30 mph); maximum road range 240 km (150 miles); gradient 60 per cent; vertical obstacle 0.76 m (30 in); trench 1.42 m (4 ft 8 in)



M50 Ontos tank destroyer as used by the US Marine Corps. Note the 12.7-mm spotting MGs above the top four 106-mm recoilless rifles. Once these had been fired the crew had to leave the vehicle to reload them.

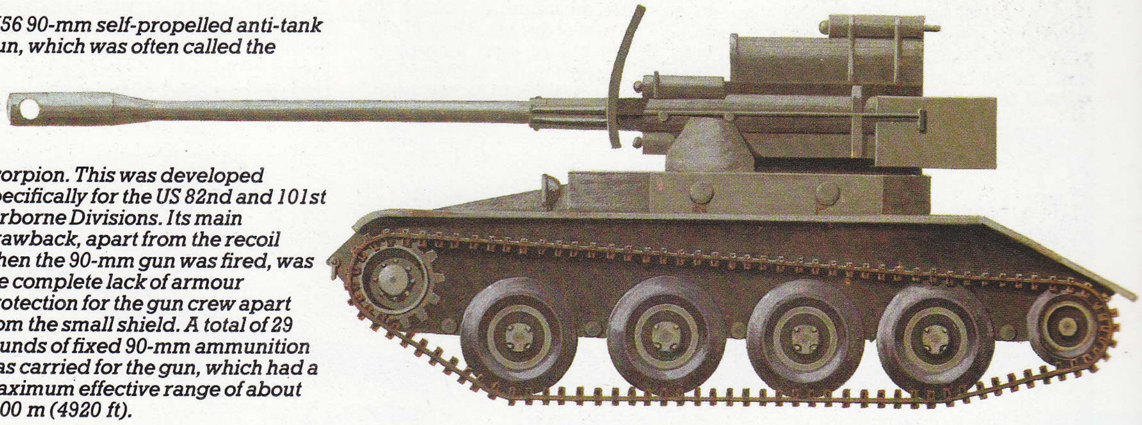
USA

M56 90-mm airborne self-propelled anti-tank gun

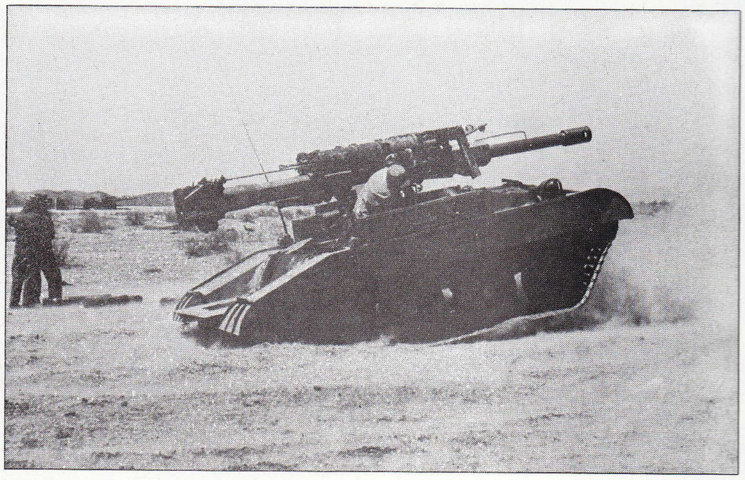
Apart from hand-held weapons, the most important anti-tank weapon used by US airborne forces in World War II was the jeep-towed 57-mm anti-tank gun M1, which was essentially the British 6-pdr made in the United States. After the war a requirement was issued for a highly mobile self-propelled anti-tank gun that could be air-dropped by parachute during the initial phases of airborne operations and have a firepower similar to that of a tank. Two prototypes of a vehicle called the **T101** were built by the Cadillac Motor Car Division of the General Motors Corporation. Further development resulted in the improved **T101E1** which was eventually standardized as the **Gun, Anti-tank, Self-propelled 90-mm M56**, or more commonly the **Scorpion.** Production was undertaken by the Cadillac Motor Car Division between 1953 and 1959. In the US Army the M56 was issued only to the 82nd and 101st Airborne Divisions, but was replaced in the 1960s by the M551 Sheridan Armored Reconnaissance/Airborne Assault Vehicle. A few M56s were supplied to Spain and Morocco, and some were also deployed by the US Army to Vietnam, where they were used mainly in the fire-support role.

The hull of the M56 was of all welded and riveted aluminium construction, with the engine and transmission at the front, gun in the centre and the crew area at the rear. The engine was coupled to a General Motors Corporation (Allison Division) transmission with one reverse and two forward ranges which in turn supplied power to the final drives on each side. The suspension was of the torsion-bar type with four rubber-tyred road wheels, idler at the rear and drive sprocket at the front; there were no track-return rollers. The track consisted of a steel-reinforced endless rubber-band.

The main armament was a 90-mm gun M54 fitted with a muzzle brake and a vertical sliding breech block. The gun had an elevation of +15° and depression of −10°, and a traverse of 30° left and right, all manual. A total of 29 rounds of fixed ammunition was car-



M56 90-mm self-propelled anti-tank gun, which was often called the Scorpion. This was developed specifically for the US 82nd and 101st Airborne Divisions. Its main drawback, apart from the recoil when the 90-mm gun was fired, was the complete lack of armour protection for the gun crew apart from the small shield. A total of 29 rounds of fixed 90-mm ammunition was carried for the gun, which had a maximum effective range of about 1500 m (4920 ft).



One of the prototypes of the M56, then designated the T101, shortly after the 90-mm gun had fired, showing the gun recoilling to the rear and the forward part of the chassis lifting clear of the ground. The dust often obscured the gunner's line of sight for the next shot.

ried under and to the rear of the gun; AP-T, APC-T, HE-T, HEAT, HEAT-T, HEP-T, WP, TP-T, HVAP-T and HVTP-T rounds could be fired. The main drawback of the M56, which had much better firepower than the M41 light tank with its 76-mm gun, was that the chassis was too light and when the 90-mm gun was fired the vehicle often moved several feet and the target was obscured by dust from the muzzle brake.

Another drawback was the complete lack of armour protection for the crew, apart from the very small shield. The driver was seated to the left of the gun with the gunner to the rear; the latter was provided with a sight with a magnification of ×4.1 or ×8.

The chassis of the M56 was also used as the basis for a number of other vehicles including an armoured personnel carrier with a much higher superstructure with the troop compartment at the rear, 81-mm and 107-mm self-propelled mortar carriers, a 106-mm M40 recoilless anti-tank gun carrier, a missile launcher and an anti-aircraft vehicle fitted with four 12.7-mm (0.5-in) M2HB machine guns; none of these entered production or service.

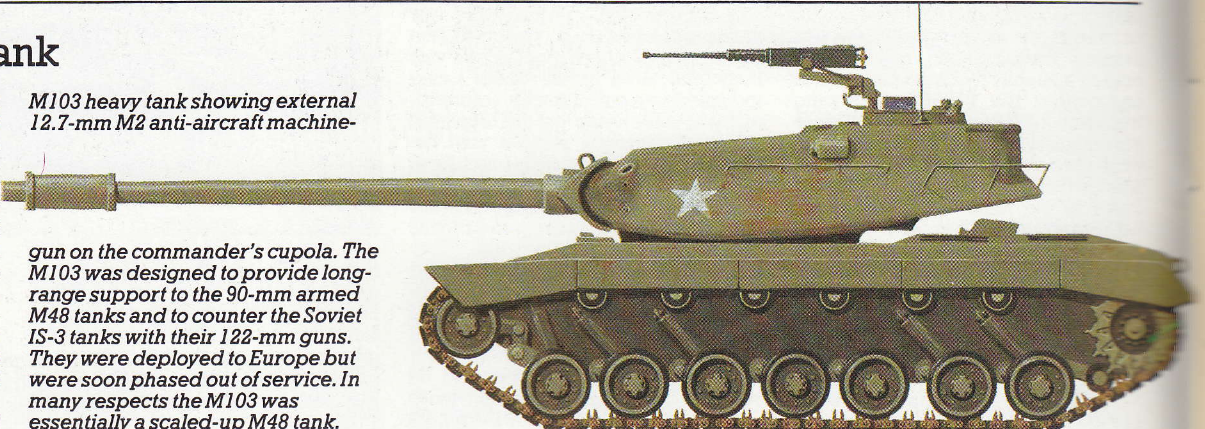
Specification

Crew: 4
Weight: 7.03 tonnes
Dimensions: length (including gun) 5.841 m (19 ft 2 in); length (hull) 4.555 m (14 ft 11⅓ in); width 2.577 m (8 ft 5½ in); height 2.067 m (6 ft 9⅓ in)
Powerplant: one Continental 6-cylinder petrol engine developing 200 bhp (149 kW)
Performance: maximum road speed 45 km/h (28 mph); maximum road range 225 km (140 miles); gradient 60 per cent; vertical obstacle 0.762 m (30 in); trench 1.524 m (5 ft 0 in)

USA

M103 heavy tank

The standard American heavy tank at the end of World War II was the M26 Pershing, which saw action in the closing months of the European campaign; in the post-war period this was reclassified as a medium tank and again saw combat in Korea. Development of heavy tanks continued in the USA, a number of prototypes being built including the T29, T30, T34 and T32. With the advent of the Cold War design work commenced on three new tanks, the T41 light tank which was standardized as the M41, the T42 medium which resulted in the M47, and the **T43**. Trials with prototypes of the last revealed numerous deficiencies especially in the areas of turret and gun control equipment, and in the sighting system, none of which met the specifications of the user. Trials with modified vehicles designated **T43E1** showed that over 100 additional modifications were required, but the vehicle was eventually standardized as the **Tank, Combat, Full Tracked, 120-mm, M103**. A total of 200 vehicles was built by Chrysler at the Detroit Tank Plant between 1952 and 1954 for deployment with the 7th Army in Europe, where it was found that the weight and small range of action made the type difficult to employ. There were also constant reliability problems, and the M103s were phased out of service with the US Army in the 1960s. A number were supplied to the US Marine Corps, and in the 1960s 153 vehicles were fitted with a type of new engine, which increased operational range from 130 to 480 km (80 to 300 miles); these were designated **M103A2**. They have since been phased out of service with the US Marine Corps, and none was supplied to any foreign countries under the MAP. The role of the M103 was to provide direct assault and long-range anti-tank support to the M47 and later the M48 (a similar role to that of the British Conqueror heavy tank developed at the same time).

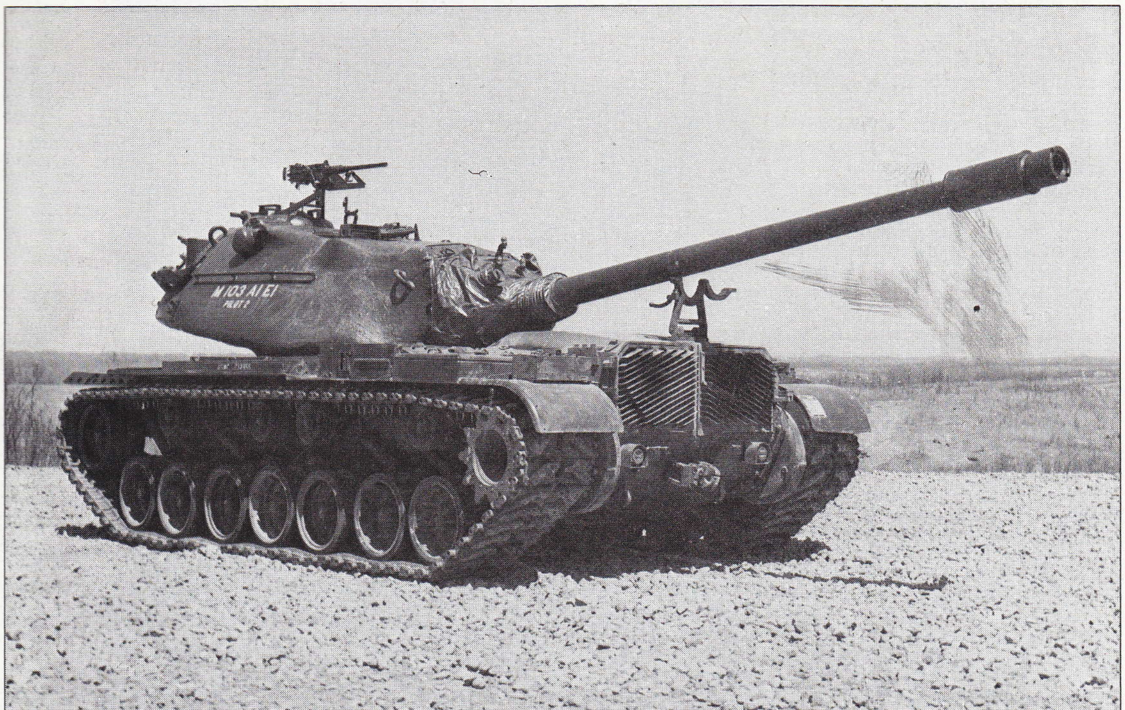


M103 heavy tank showing external 12.7-mm M2 anti-aircraft machine-gun on the commander's cupola. The M103 was designed to provide long-range support to the 90-mm armed M48 tanks and to counter the Soviet IS-3 tanks with their 122-mm guns. They were deployed to Europe but were soon phased out of service. In many respects the M103 was essentially a scaled-up M48 tank.

In many respects the M103 was virtually a scaled-up M48, with the driver at the front, turret and fighting compartment in the centre, and the engine and transmission at the rear. The commander's cupola, which was provided with an externally mounted 12.7-mm (0.5-in) M2HB machine-gun for anti-aircraft defence, was in the centre of the turret at the rear, while the gunner and one of the loaders were seated forward on the right with the second loader on the left. The torsion-bar suspension consisted of seven dual rubber-tyred road wheels (with the drive sprocket at the rear and idler at the front) and six track-return rollers.

Main armament comprised a 120-mm rifled gun with an elevation of +15° and a depression of −8°, turret traverse being 360°. Ammunition was of the separate-loading type, and a total of 38 rounds (38 projectiles and the same number of charges) was carried. The following types of ammunition could be fired: AP-T, HE, HE-T, WP, WP-T and TP-T. A 7.62-mm (0.3-in) machine-gun was mounted co-axial with the main armament, and 5,250 rounds of ammunition were carried for this; stowage was provided for 1,000 rounds of 12.7-mm (0.5-in) ammunition. Standard equipment included crew compartment heaters, deep-fording equipment, infantry telephone and a fire extinguishing system.

To support the M103 the **M51** armoured recovery vehicle was built on the same chassis. This was fitted with a rear spade, winches and a heavy-duty crane for changing major components in the field.



Specification

Crew: 5
Weight: 56.7 tonnes
Dimensions: length (gun forwards) 11.32 m (37 ft 1½ in); length (hull) 6.98 m (22 ft 11 in); width 3.76 m (12 ft 4 in); height 2.88 m (9 ft 5⅝ in)
Powerplant: one Continental AV-1790-5B or 7C V-12 petrol engine developing 810 hp (604 kW)
Performance: maximum road speed 34 km/h (21 mph); maximum road range 130 km (80 miles); gradient 60 per cent; vertical obstacle 0.91 m (36 in); trench 2.29 m (7 ft 6 in)

One of the prototypes of the M103A1E1, with its turret traversed to the rear and the gun travel lock in the open position. The M103, like the similar British Conqueror heavy tank of the same period, was difficult to use operationally in West Germany because of its size and weight, which also made it difficult to conceal.

Tank Warfare in Vietnam

Vietnam saw armour used in a variety of roles, but rarely in the classic tank-versus-tank action. Tanks proved well able to clear jungle paths, destroy VC bunkers or provide convoy escort, but many suffered damage from mines and Soviet-supplied RPG-7 anti-tank missiles.

During World War II Vietnam was occupied by the Japanese, and on their surrender the French moved back in again, so beginning a bitter campaign which finally resulted in the decisive battle at Dien Bien Phu, where the French were defeated in 1954. In Indo-China the French made considerable and often successful use of armour, especially half-tracks, M24 Chaffee light tanks and various armoured amphibious vehicles. Following the withdrawal of French units from Vietnam the country was split into two, North Vietnam and South Vietnam.

North Vietnam relied on the USSR and China for its supply of AFVs, receiving substantial numbers of Type 59, T-54, T-55 and T-34/85 tanks; Type 62 and Type 63 light tanks; the PT-76 amphibious light tank (well suited for use in Vietnam); BTR-40, BTR-50, BTR-60, BTR-152 and Type 531 armoured personnel carriers, various self-propelled artillery weapons such as the SU-100 and SU-85; and the ZSU-23-4 and ZSU-57-2 self-propelled anti-aircraft guns, with the latter staying mainly north of the border.

South Vietnam was initially equipped with old vehicles such as M3 half-tracks, M24 Chaffee light tanks and M8 and M20 Greyhound armoured cars, but with increasing American involvement more modern equipment was supplied in large numbers, including the M41 light and M48 medium tanks; the M113 series APC and its countless variants; the 155-mm M109, 175-mm M107 and 203-mm M110 self-propelled artillery weapons; and the 20-mm M163 and 40-mm M42 self-propelled anti-aircraft gun systems.

American troops arrive

In July 1965 the first American armoured units were deployed to South Vietnam with the arrival of a US Marine Corps tank battalion equipped with the 90-mm gunned M48A3, and in the following year the first US Army tank battalion arrived with similar vehicles. Initially the tanks were used to defend vital bases such as airfields, but they were soon being used to clear trails through the jungle. When fitted with a dozer blade at the front of the hull they proved to be very successful in this role. A constant danger to tanks operating in South Vietnam was the threat of mines, or unexploded aircraft bombs rigged as mines. While few tanks were in fact totally destroyed by mines, lengthy repairs often had to be carried out on the vehicle and considerable effort was often required to get the damaged tank back to the main base for repair.

Tanks were also widely used for destroying Viet Cong bunkers with their 90-mm guns firing high explosive or canister rounds with deadly effect; the heavy weight of the tanks also made many of the tunnels cave in, trapping the Viet Cong inside. The helicopter was used on a massive scale in Vietnam but many supplies of fuel, ammunition, water and other essential supplies had to be transported on roads that were open to Viet Cong observation. Tanks were widely used to escort these convoys and were then fairly easy targets for Viet Cong equipped with the Soviet-supplied RPG-7 anti-tank grenade-launcher. This weapon launches a PG-7 anti-tank rocket fitted with a HEAT warhead capable of penetrating some 320 mm (12.6 in) of armour. For this reason many M48s were fitted with sandbags and spare track links to their hulls and turrets in the pious hope of detonating the HEAT warhead away from the main armour of the tank. Additional machine-guns were often mounted on the turret roof to provide close protection as the cupola-mounted 0.5-in (12.7-mm) machine-gun was found to be unwieldy when operating in a dense jungle environment.

It was not until 1969 that the Americans first used their M48A3s in the tank-killing role: in that year they successfully destroyed two PT-76 amphibious light tanks with 90-mm HEAT rounds. In addition to the basic M48A3 the US Army used the M48 scissors bridgelayer in Vietnam, while the US Marine Corps also used the M67 series flamethrower tank which is also based on the M48 tank. The M67 is fitted with a flame gun which projects fire to a range of between 100 and 200 yards (90 and 180 m), and carries sufficient fuel for some 60 seconds of operation. It was normal to fire short bursts rather than one continuous burst. To operate with the M48 tank the M88 recovery vehicle was also deployed to Vietnam in some numbers, and this proved invaluable in recovering disabled and damaged vehicles.

T-54 tank of the Viet Cong with infantrymen aboard, in front of Independence Palace in Saigon in May 1975. There were many engagements between South Vietnamese M48 tanks and North Vietnamese Soviet-supplied T-54/T-55s and Chinese-supplied Type 59s.

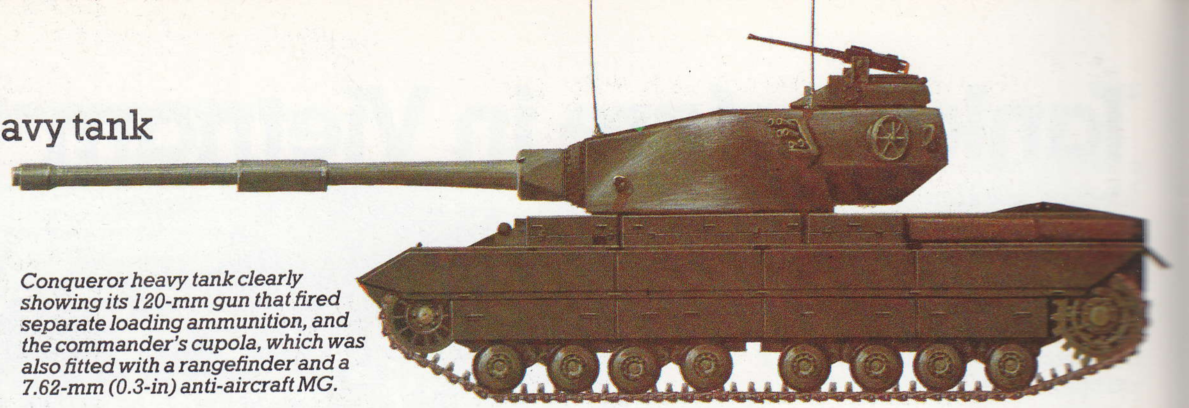
It is often forgotten that the Australian army played a major role in Vietnam, and one squadron of the 1st Armoured Regiment, Royal Australian Armoured Corps, was deployed to the country to support Australian infantry. This unit was equipped with the British Centurion tank armed with the 20-pounder gun and supported by the Centurion Mk 2 ARV (armoured recovery vehicle) and Centurion Mk 5 bridgelayer. From all accounts the Centurion gave a good account of itself, although it was never used to engage enemy tanks. Its superior armour protection over the American M48 enabled it to withstand far better the effect of RPG-7 HEAT projectiles.

Towards the end of the war North Vietnamese armoured units were operating in South Vietnam in some numbers, and in 1972 a South Vietnamese tank regiment equipped with the M48A3 successfully engaged PT-76 and T-54 tanks, destroying several of these without losing any tanks to enemy tank fire.

US Army M48 tanks in Vietnam. Firing canister rounds in the infantry support role, the tanks proved deadly to camouflaged VC positions.

UK

Conqueror heavy tank



Conqueror heavy tank clearly showing its 120-mm gun that fired separate loading ammunition, and the commander's cupola, which was also fitted with a rangefinder and a 7.62-mm (0.3-in) anti-aircraft MG.

In 1944 authorization was given to commence the **A45** tank project as the replacement for the A43 Black Prince, which itself was based on the Churchill infantry support tank. The A45 was intended to work with the A41 Centurion tank and share a number of common automotive components. In 1946 it was decided to develop a whole new range of armoured vehicles including the **FV200 Universal Tank** family, and in addition to the **FV201** basic gun tank a number of specialized vehicles were proposed including an AVRE, mine-clearing vehicle of the flail type, bridgelayer, ARV, assault personnel carrier, and a number of specialized vehicles for the Royal Artillery. The FV200 series was based on the A45 but had a longer hull, and the first prototype was completed in 1948. It was soon realized that many of the proposed variants were not feasible: the bridgelayer, for example, would be too large for the standard LCT. A decision was therefore taken to continue development of the Centurion as a gun tank and as the basis for a complete family of specialized vehicles. This proved to be a wise decision, and the Centurion family became the most successful tank of the post-war period, remaining in service to this day.

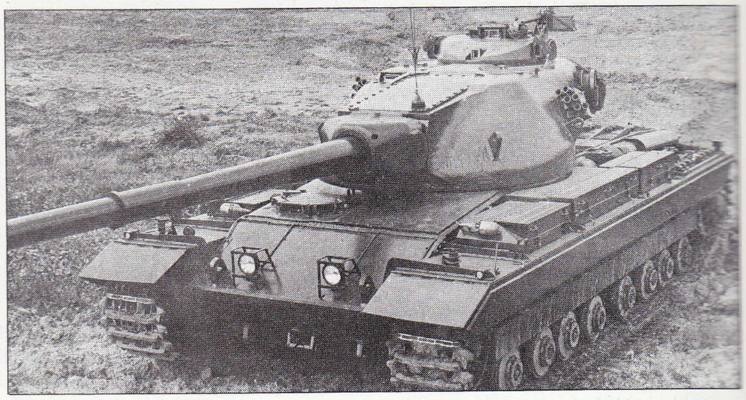
There was, however, a requirement for a heavy gun tank, the **FV214**, and the FV201 was used as the basis for this vehicle. To provide some experience with a tank of this size a chassis was fitted with the complete turret of the Centurion Mk 3 tank and called the **FV221 Medium Gun Tank Caernarvon.**

Just under 200 **FV214 Conqueror** tanks were built between 1955 and 1958, the majority of these being deployed to the British Army of the Rhine where they were issued to some of the armoured regiments on the basis of a troop of three vehicles or one Conqueror per Centurion squadron. The only advantage of the Conqueror over the Centurion with the 20-pdr gun was the former's improved armour protection and longer range of its main armament. Its major disadvantages were that it was too large, too heavy and difficult to maintain. The Conquerors were all withdrawn in the mid-1960s with the arrival of the Centurion with the 105-mm gun, and most ended up on ranges as hard targets, although one or two have been preserved.

In all there were over 30 projected models on the FV200 chassis, but the only model to see service apart from the Conqueror tank was the **FV219 ARV Mk 1.** One of the more interesting projects was the **FV215b** heavy-self-propelled anti-tank gun which had the engine moved forward to enable a limited-traverse turret (armed with a 180-mm gun) to be mounted at the rear.

The layout of the Conqueror was conventional, with the driver at the front on the right and ammunition to his left; turret and fighting compartment in the centre; and engine and transmission at the rear. The commander was provided with his own cupola in the centre of the turret at the rear, with the gunner forward to the right and the loader to the left. Main armament comprised a 120-mm rifled gun with an elevation of +15° and a depression of −7° in a turret capable of traversing through 360°. A weapon stabilization system was installed, this being similar to that of the Centurion. A total of 35 rounds of APDS or HESH ammunition was carried, this being of the separate-loading type. An unusual feature of the Conqueror was the cartridge case ejection system: this ejected the spent brass cartridge case out through a trap door on the right side of the turret. A 7.62-mm (0.3-in) machine-gun was mounted co-axial with the main armament, and a similar machine-gun was mounted on the commander's cupola for anti-aircraft defence.

Specification
Crew: 4
Weight: 65 tonnes
Dimensions: length (gun forwards) 11.58 m (38 ft 0 in); length (hull) 7.72 m (25 ft 4 in); width 3.99 m (13 ft 1 in); height 3.35 m (11 ft 0 in)
Powerplant: one 12-cylinder petrol engine developing 810 bhp (604 kW)
Performance: maximum road speed 34 km/h (21.3 mph); maximum road range 155 km (95 miles); gradient 60 per cent; vertical obstacle 0.91 m (36 in); trench 3.35 m (11 ft 0 in)



The Conqueror was produced to provide long-range fire support to the Centurion, but was phased out of service in the 1960s.

UK

Centurion Main Battle Tank

The **Centurion** was developed during World War II as a cruiser tank under the designation **A41**, the first prototypes being completed early in 1945 and armed with the 17-pounder gun. The A41 was subsequently renamed the Centurion and entered production shortly after the end of the war. By the time production was completed in 1962, some 4,423 examples had been completed at four plants, namely the Royal Ordnance Factories at Leeds and Woolwich (early vehicles only), Leyland Motors at Leyland and Vickers at Elswick. The **Centurion Mk 1** and **Mk 2** were armed with the 17-pounder (76.2-mm gun), and the **Centurion Mk 3** with the 20-pounder (83.4-mm) gun. A total of 13 basic marks of Centurion were fielded, many of these having no less than three submarks. For example, the **Centurion Mk 10** was a **Mk 8** with more armour and a 105-mm L7 gun, the **Centurion Mk 10/2** was Mk 10 with ranging machine-gun. All though its British army life the Centurion had the standard Rolls-Royce Meteor petrol engine which was a development of the Merlin aero engine. The Centurion was replaced as a gun tank in the British army by the Chieftain, but the last Centurions, used as observation post vehicles by the Royal Artillery, were not phased out of service until very recently.

Many countries placed orders for the Centurion, and early in 1983 gun Centurions were still in service with Denmark, Israel, Jordan, the Netherlands, Somalia, South Africa, Sweden and Switzerland. Many of these countries have rebuilt the vehicle to extend its life well into the 1990s. For example Israel has replaced the petrol engine by a Teledyne Continental AVDS-1790-2A diesel coupled to an Allison CD-850-6 automatic transmission, this giving the tank a maximum speed of 27 mph (43 km/h) and a cruising range twice that of the Mk 5 hull on which the conversion is based. The Israeli Centurions, which when rebuilt are redesignated **Upgraded Centurion**, all have the 105-mm gun and carry additional ammunition.

There have been many specialized versions of the Centurion, including a variety of self-propelled weapons including the 25-pounder, 5.5-in and 180-mm guns, and a 120-mm tank destroyer. Versions that remain in service include the **Centurion Mk 2 ARV** fitted with large spades at the hull rear and a winch with a capacity of 31 tonnes, which with snatch blocks can be increased to 90 tonnes. The **Centurion/AVRE (Assault Vehicle Royal Engineers)** is used only by the British army and is fitted with a turret-mounted 165-mm demolition gun for the destruction of battlefield fortifications and a dozer blade at the front of the hull. It can also carry a fascine (large bundle of wood) which can be dropped into anti-tank ditches to enable following vehicles to cross, as well as tow a trailer carrying the ROF Giant Viper mine-clearance equipment. The **Centurion BARV** (Beach Armoured Recovery Vehicle) is another specialized version unique to the British army, and this is used to recover disabled vehicles on an invasion beach, as well as to push landing craft off the beach. The BARV was successfully used during the British landings at San Carlos Water in the Falklands. Other versions include the **Centurion AVLB** (armoured vehicle-launched bridge) and target tanks, while the Israelis have fitted a number of vehicles with special dozer blades and roller-type mine-clearing equipment.

The reason why the Centurion has been such a successful design is that it has been able to accept more armour and a larger gun (from the 17-pounder to the 20-pounder and finally to the famous 105-mm L7 gun) as the threat and technology have changed. All models have been fitted with a gun stabilization system which keeps the gun on the target when the tank is moving across country, and many countries today are now installing advanced fire-control systems which include a laser rangefinder. The Centurion has seen combat with the British army in Korea, with the Australian army in Vietnam, with the Indian army against Pakistan, and with the armies of Israel, Egypt and Jordan in the Middle East. To many people, the Centurion has been the most successful tank design in the history of armoured warfare.

Specification
Crew: 4
Weight: 51.82 tonnes
Engine: Rolls-Royce Meteor Mk IVB V-12 petrol developing 650 bhp (485 kW)
Dimensions: length (with gun forward) 9.854 m (32 ft 4 in); length (hull) 7.823 m (25 ft 8 in); width 3.39 m (11 ft 1½ in); height (without AA MG) 3.009 m (9 ft 10½ in)
Performance: maximum road speed 34.6 km/h (21.5 mph); range 190 km (118 miles); gradient 60%; vertical obstacle 0.914 m (3 ft 0 in); trench 3.352 m (11 ft 0 in)

Centurions in Action

There can be few major weapon systems still in front-line service almost 40 years after their introduction, yet the Centurion, active with that most experienced tank force, the Israeli army, first saw battle in the last days of the Third Reich.

Centurions of the Royal Australian Armoured Corps armed with 20-pdr guns in South Vietnam in the 1960s. In the background is a Centurion Mk 2 ARV, while overhead is a RAAF Iroquois helicopter.

The Centurion tank arrived just too late to take part in any major operation before the end of World War II in Europe. A few did take part in some minor infantry support operations, allowing some valuable tactical evaluation experience to be gained. The Centurion had to wait over five years before going into real action.

The Centurion first saw combat in Korea. On 14 November 1950 three squadrons of the King's Royal Irish Hussars landed their Centurion Mk 3s at Pusan as part of the United Nations response to the invasion of South Korea by North Korea. Once ashore the Centurions joined a single squadron (equipped with Comet tanks) that was to act as the regiment's reconnaissance unit, and this force then became the armoured component of the British 29th Independent Brigade, the main British contribution to the United Nations' effort. The main problem for the 'tankies' was that once ashore there was precious little for them to do. On odd occasions some tank-versus-tank scraps did take place and some results were achieved, but in the main Korea is not a country suitable for armoured warfare. The bulk of the country is occupied by bleak mountains and the coastal plains are small and built-up, so there is little space for any large tank manoeuvres. Consequently the Centurions were largely restricted to local support of infantry operations. Very often this meant little more than advancing as the infantry advanced. Even these limited operations grew infrequent once winter and trench warfare set in during late 1951 and there was even less call for tanks.

In such circumstances the Centurions were often reduced to no more than mobile artillery pieces. Their 20-pdr guns sometimes joined in artillery barrages, but it was really a waste of their potential. They did have their successes, however, one of them spectacular to an extreme when on one shoot a 20-pdr shell hit a Mikoyan-Gurevich MiG-15 as it swept low over a valley, right into the path of the shells!

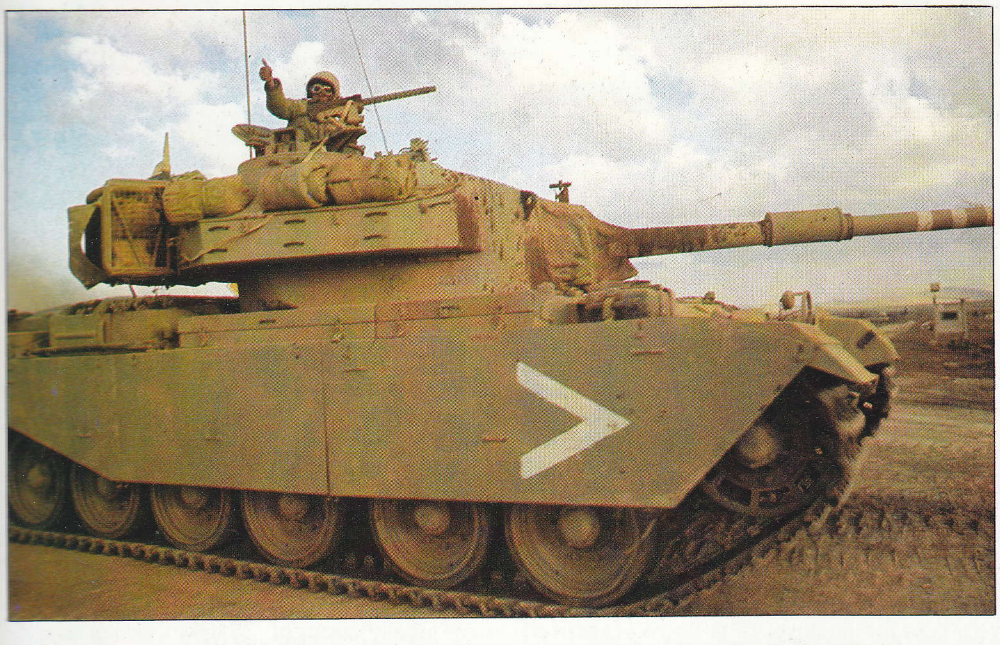
But for much of the time the Centurions could do little. In December 1951 the 5th Royal Irish Dragoon Guards replaced the 8th KRIH and a year later the 1st Royal Tank Regiment arrived to take over from them. Not long after that the armistice talks started and the fighting stopped. The talks are still in progress to this day.

The first troops to use Centurions on a really large scale in true armoured conflict were the Israelis during the 1967 Middle East War. By 1967 the Israeli army had developed immensely in sophistication and numbers from the days of the 1948 War of Independence. They had gradually accumulated Centurions from a number of sources and through a diversity of routes, and their introduction to the Israeli army was far from smooth. The troops failed at first to realize the amount of maintenance and care that the fire-control and other systems demanded. Gradually they tamed the complexities of the beast, for by 1967 the Centurion had gained a more powerful engine and the 105-mm L7A1 gun was in use.

It was just as well that this was the case, for the Six-Day War proved a model of how armoured forces should be handled when pitted against an enemy superior in numbers. In the campaign against Egypt the Israeli army used three main armoured task forces, equipped mainly with Centurions and Pattons but with a few much-modified Shermans in train. These task forces advanced rapidly against numerically superior Egyptian forces armed mainly with a mix of T-34 tanks and Su-100 self-propelled assault guns. Fortunately for the Israeli tank columns many of the Egyptian armoured vehicles were dug in as 'hedgehog' strongpoints, which completely negated their mobility, and the Israelis were able to sweep past them to penetrate the Egyptian rear. This meant that the task forces were able to reach the important Giddi and Mitla Passes and seal them off. The Centurions then progressed to the Suez Canal. It was all over in six days.

Centurions took only a small part in the fighting in the north against the Syrian forces. There the armoured forces were operating mainly in the Golan Heights and the surrounding uplands. There was little opportunity for the

Israeli tankers abandon their knocked-out Centurion tank. These tanks are taken off the battlefield as quickly as possible, so that they can be repaired and returned to service.



Centurion of the Israeli armoured corps with 105-mm gun and extensive external stowage on turret. The Centurion has been in service with Israel for some 20 years.

type of combat that took place in the Sinai and most of it was direct infantry support carried out by small AMX-13s and Shermans. The whole campaign against Syrian forces lasted only 27 hours.

On the Jordanian front Centurion activity was limited to company level in conjunction with formations of modified Shermans, but although useful numbers of Centurions were on the strength of the Jordanian army, they seem to have been little used in the short operation that led to the Israelis' capture of Jerusalem, a prize that had evaded them in the War of Independence 16 years before.

Israeli fighting skills

The stunning successes of the Six-Day War were not won by the weapons alone, although the Centurions proved themselves to be excellent battle tanks. They were able to pick off their enemies at ranges of well over 2000 m (2,185 yards), and they proved well able to absorb both battle damage and the ravages of long high-speed journeys across desert terrain. But it was not just this alone that gave the Israelis their successes: it was in reality a combination of high-speed manoeuvres, close co-operation with other arms, and a high degree of training of all concerned. When these attributes were combined with the seemingly natural talent for the type of fighting concerned from Israelis drawn from all the nations of Europe and elsewhere, the results are more understandable. What is not so understandable was that the personnel concerned were largely reservists who had moved directly from their homes and places of work into battle. These reservists had undergone a great deal of training, but training is no substitute for the real thing and the reservists got that in the Sinai. How they managed so well is still a bit of a military mystery, but the Israelis proved they have a flair for armoured warfare, and in the Centurion it seemed they had the perfect vehicle to carry out their intentions.

With the Six-Day War over the Israelis settled once more to training, with the whole of the Sinai to train in. The Centurions were gradually modernized with new radios, new fire-control systems, and all the Centurions in the Israeli army were equipped with the L7 105-mm gun. A project to replace their engines with new and more powerful diesel engines with a reduced fuel consumption also began. By this time the Centurions were being supplemented with larger numbers of Pattons of various marks and even T-54s and T-55s captured from Syria and Egypt.

In 1973 came the conflict now generally known as the Yom Kippur War. This time the Israelis were caught napping as large Egyptian forces crossed the Suez Canal and the Syrian army swept down from the Golan heights. In the Sinai a series of desperate counterattacks, often using Centurions, were thrown against the Egyptian hordes, but the Israelis soon encountered the Soviet AT-3 'Sagger' wire-guided missiles that the Egyptians carried with them and the Centurions suffered accordingly. These costly counterattacks soon grew in cohesion and striking power as more troops and tanks joined the battle. Once the main Egyptian impetus had been spent the Israelis gained the ascendancy and even managed to cross the Suez Canal before the fighting ceased.

Farther north the battle against the Syrians was even more remarkable. There the Syrians had carried out a full-scale set-piece armoured attack against weak and unprepared Israeli units. Thousands of Syrian T-54s and T-55s moved forward in a great phalanx against the Israeli positions where only a few tanks, including Centurions, waited for them. It was to turn out as another David and Goliath result: with no room in which to fall back the Israelis had to stand their ground. With artillery and air strike support they moved from point to point, constantly firing at their massed opponents who seemed largely unable to operate independently once the attack was under way. Single Centurions were able to pick off their opponents one by one until the areas in front of the Israeli lines resembled tank graveyards. The Israelis suffered heavily, not only in tanks but in men, but they held on long enough for the reserves to come into action and carry on the fight.

When the shattered Syrian remnants fell back across the Golan Heights the Israelis followed. It had been a desperate slog. When the fighting stopped the Israelis had gained the upper hand on both the main fronts. Large amounts of captured material were in their hands and they were at the gates of Cairo and Damascus. But once again victory had not brought peace and the years following 1973 were years of guerrilla operations and counter-strokes. The Centurion units were often involved in these counter-strokes which culminated in the largest of them all: the advance to Beirut that took place in June 1982.

When the Lebanese operation got under way the Centurion was still an important Israeli tank, but no longer the only one. It had been supplemented by numbers of the new Israeli-designed Merkava, designed around many of the better points of the Centurion with operational innovations shown to be necessary by the string of campaigns since 1967. The Centurion had an innovation too in the form of small plates suspended all over the hull and turret. These plates were the Israeli answer to the AT-3 'Sagger' and its many cousins. These plates contain a special explosive detonated by the missile strike, and are intended to 'blast out' the destructive jet of armour-piercing gases formed by the missile's warhead. How successful this innovation has proved to be is still uncertain as few missiles have been fired against tanks in the Lebanon. Other innovations fitted to the Centurions include anti-tank mine rollers and ploughs, and a dozer blade. The Israeli Centurions can also tow ferries and bridging equipment. The Centurion is still a front-line weapon in the Israeli army and is still being modified to suit local requirements.

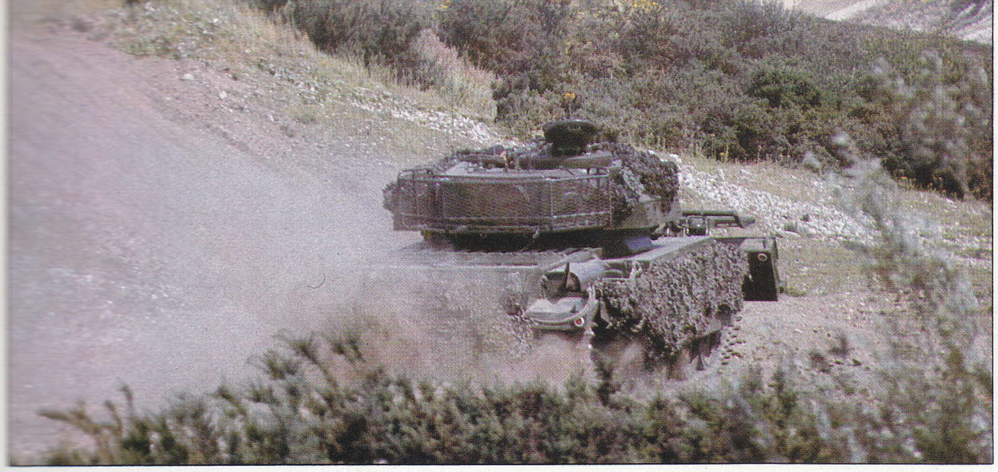
Farther east, on the Indian sub-continent, the Centurion has been involved in all of the India-Pakistan conflicts on the side of the Indian army. Accounts of these conflicts vary according to which side is relating the story, but it would seem that in the tank-versus-tank battles that did take place the Centurion proved to be an able opponent.

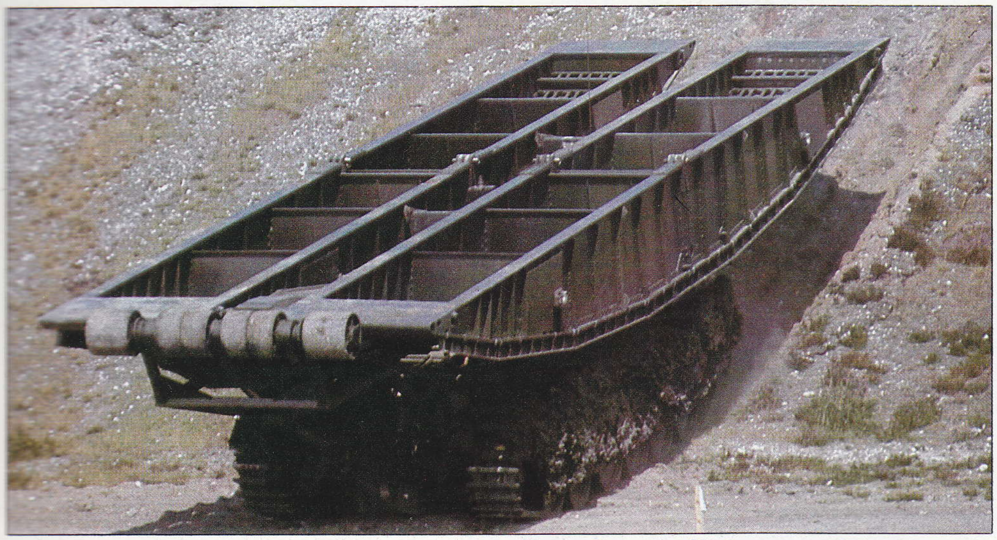
Against the Viet Cong

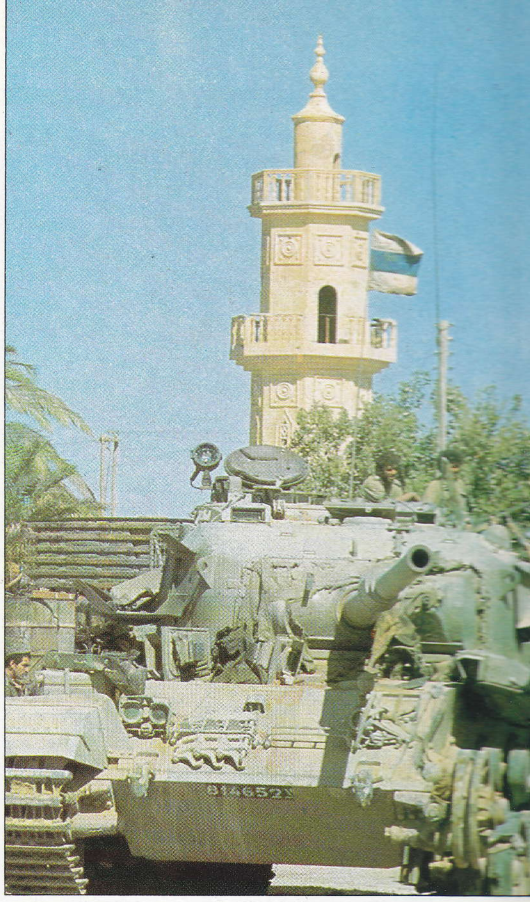
Even farther east, in Vietnam, the Centurion went to war with the Australian contingent that added its weight to the American and South Vietnamese forces fighting the North Vietnamese. The Australian army has only one armoured formation, the 1st Armoured Regiment, Royal Australian Armoured Corps, and various squadrons from this regiment served in Vietnam at different times. They took with them not only their Centurions but their Centurion armoured recovery vehicles (ARVs) and their Centurion bridgelayers. In Vietnam there was little enough in the line of armoured warfare to perform and their activities were largely confined to local support and escort operations, with their main guns being fired only infrequently.

The Centurion is still an intermittent active service in South West Africa. The South African Defence Forces have a number of Centurions which they have updated to take locally-produced 105-mm guns and new engines and transmissions. These modified vehicles are known as Olifants (Elephants) and on occasion provide support for the deep-penetration operations against SWAPO guerrillas in Angola.

So the Centurion has seen its shares of action, especially in the Middle East. It has always proved itself to be a sound and sturdy vehicle capable of taking all manner of punishment, not only from the enemy but from long hard use over difficult terrain. Internally it is roomy and well-equipped as tanks go, and there is still the potential for the Centurion to endure many future campaigns. The Centurion will be around for a long while to come.





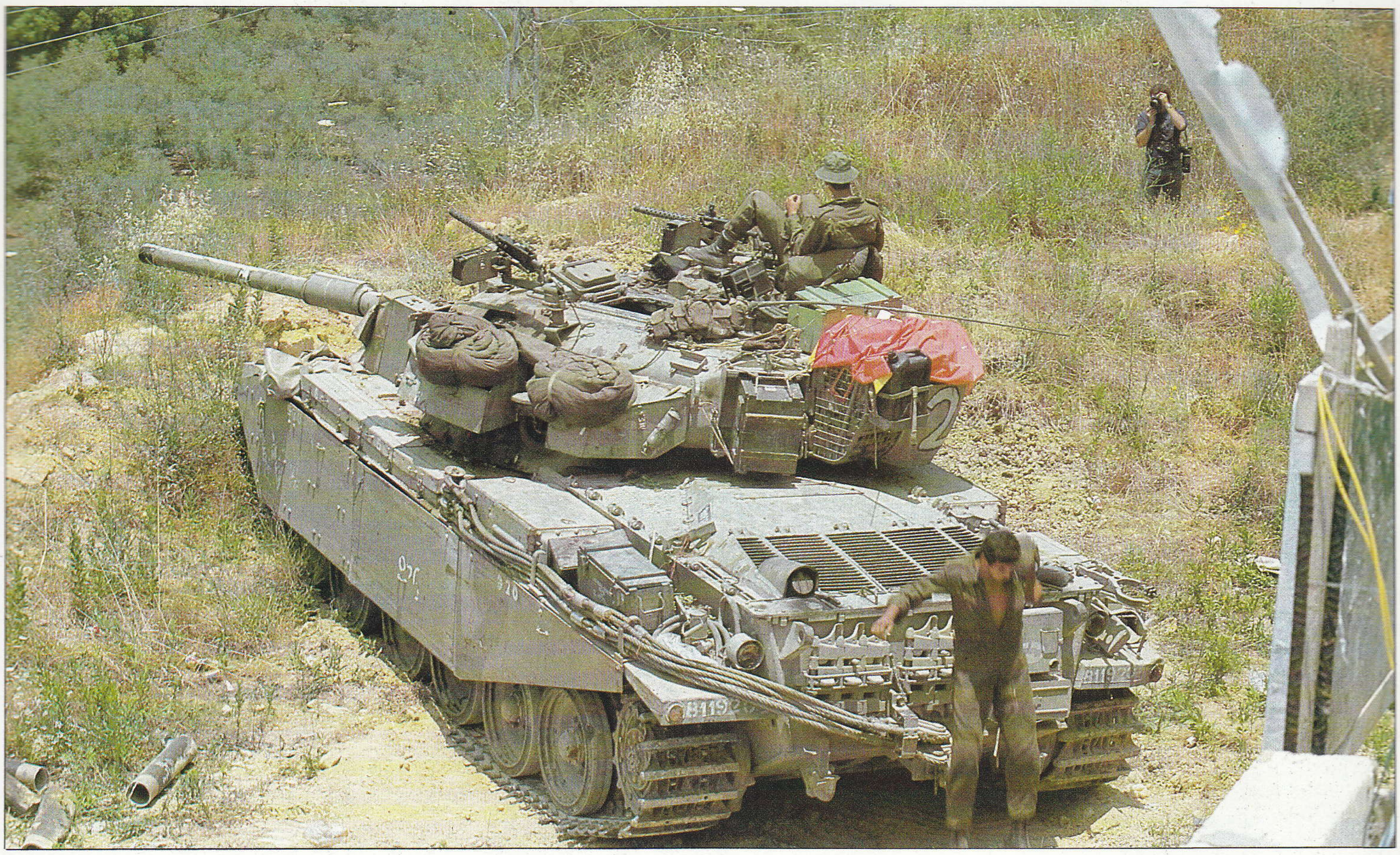


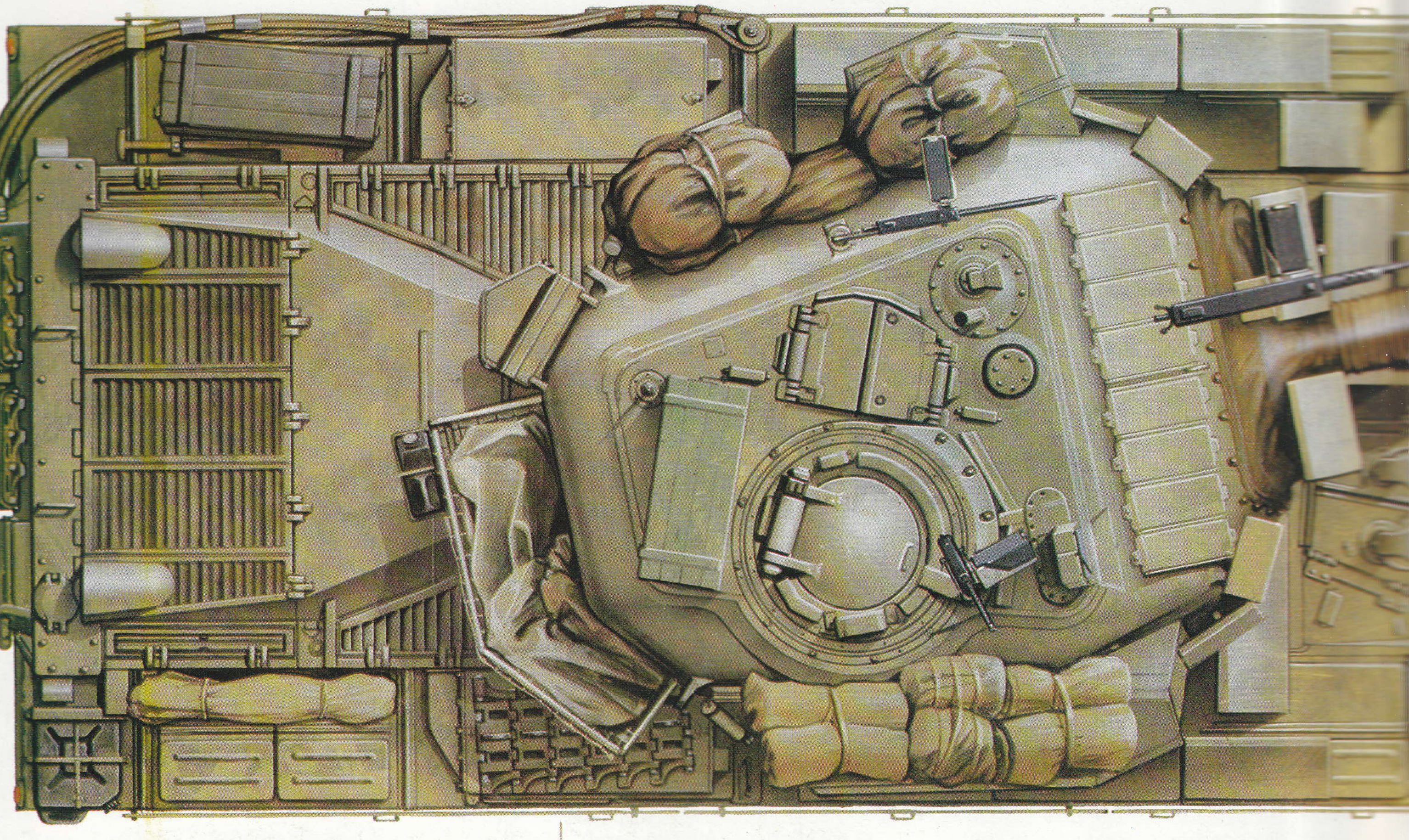
Above: Centurion of the Israeli army with all hatches open. All Israeli Centurions now have a Teledyne Continental diesel engine and an automatic transmission.

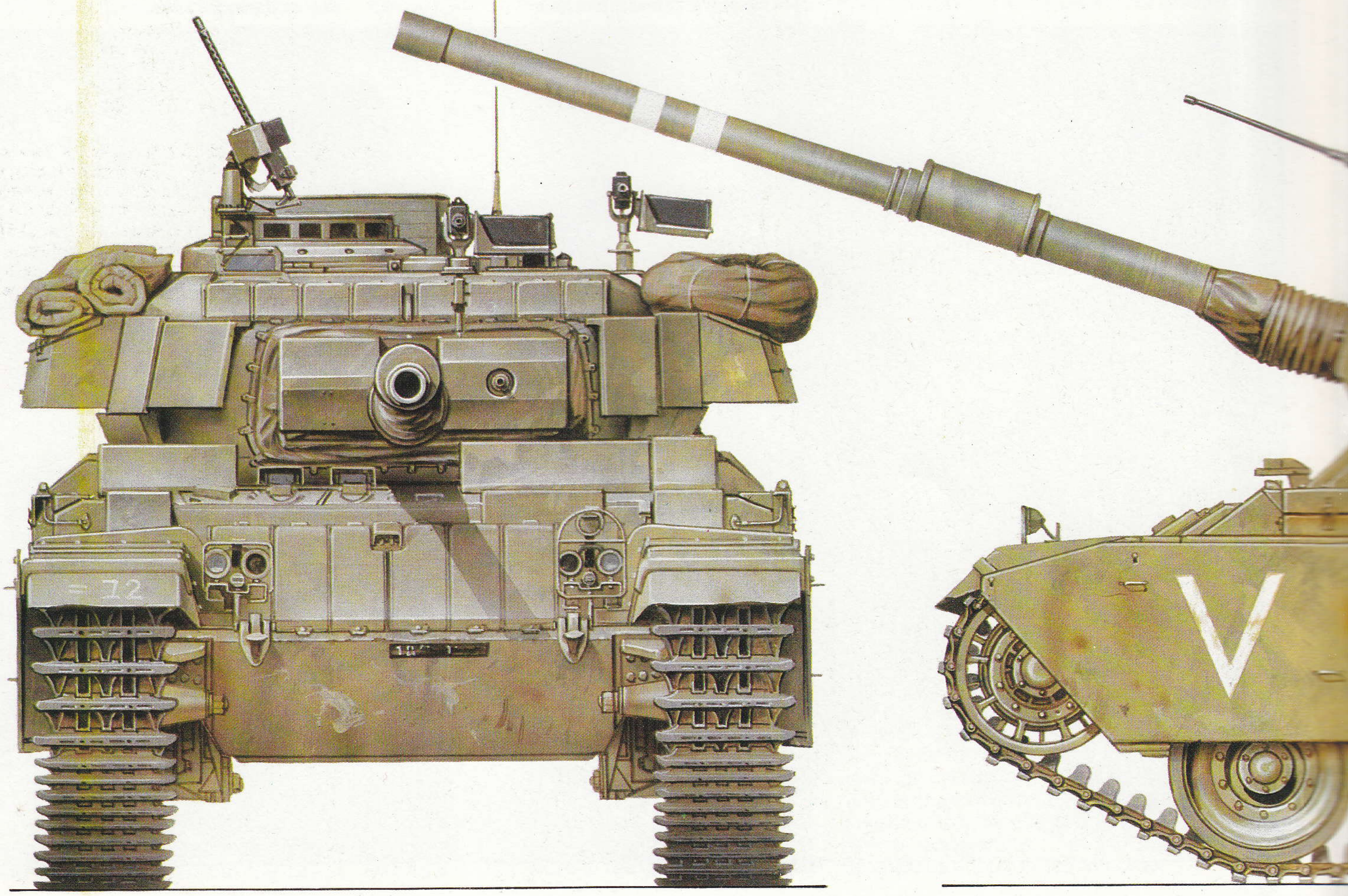
Top: Centurion AVRE (Assault Vehicle Royal Engineers), which is fitted with a front-mounted dozer blade and a 165-mm demolition gun.

Above: Centurion Mk 5 armoured bridgelayer of the British army in travelling order. When required the bridge is swung forwards through 180 degrees and laid in position.

Below: Israeli Centurion with 105-mm gun in Beirut in the summer of 1982. Note the extra 12.7-mm MG over the 105-mm gun, and the red air recognition flag on the turret rear.



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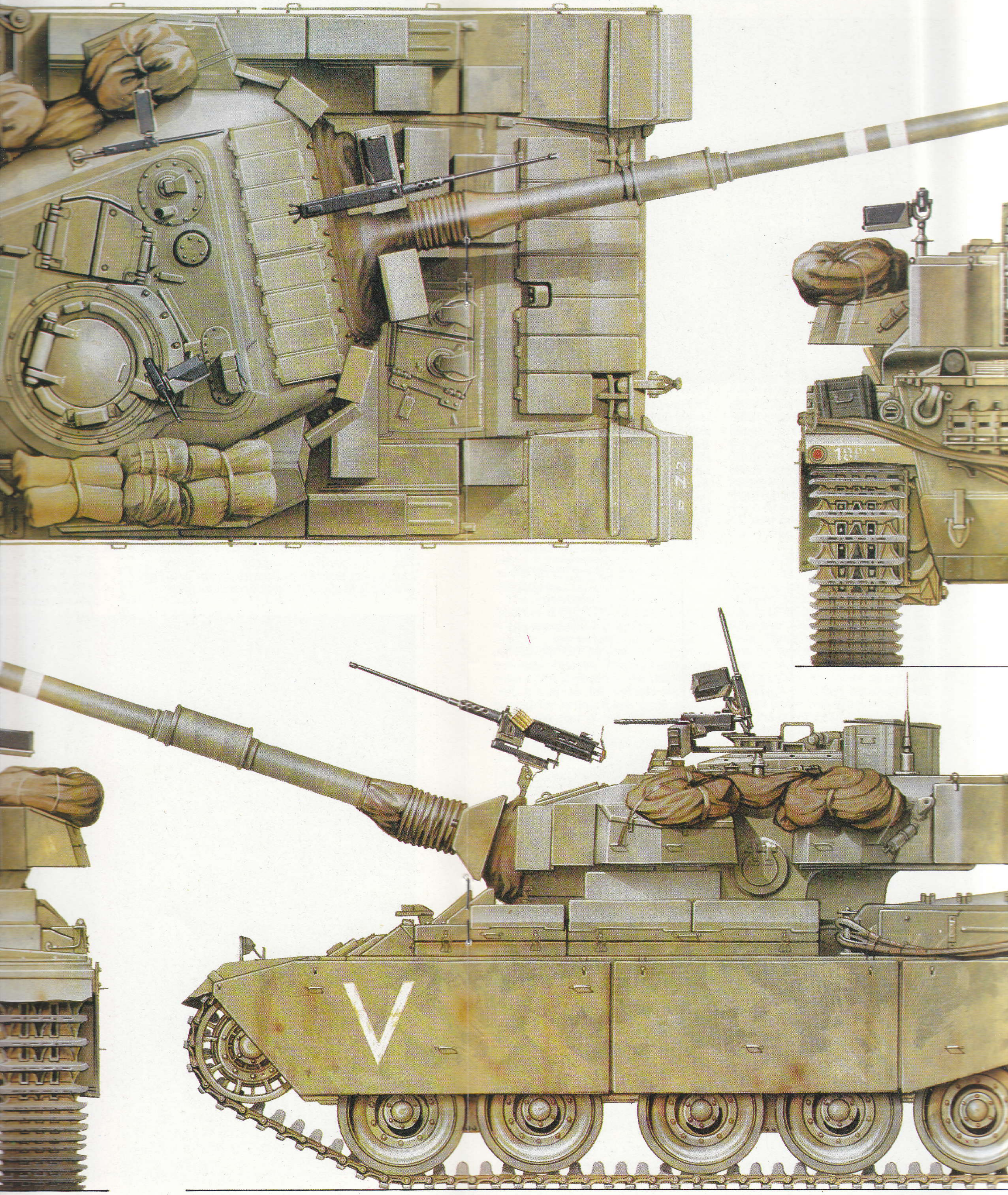
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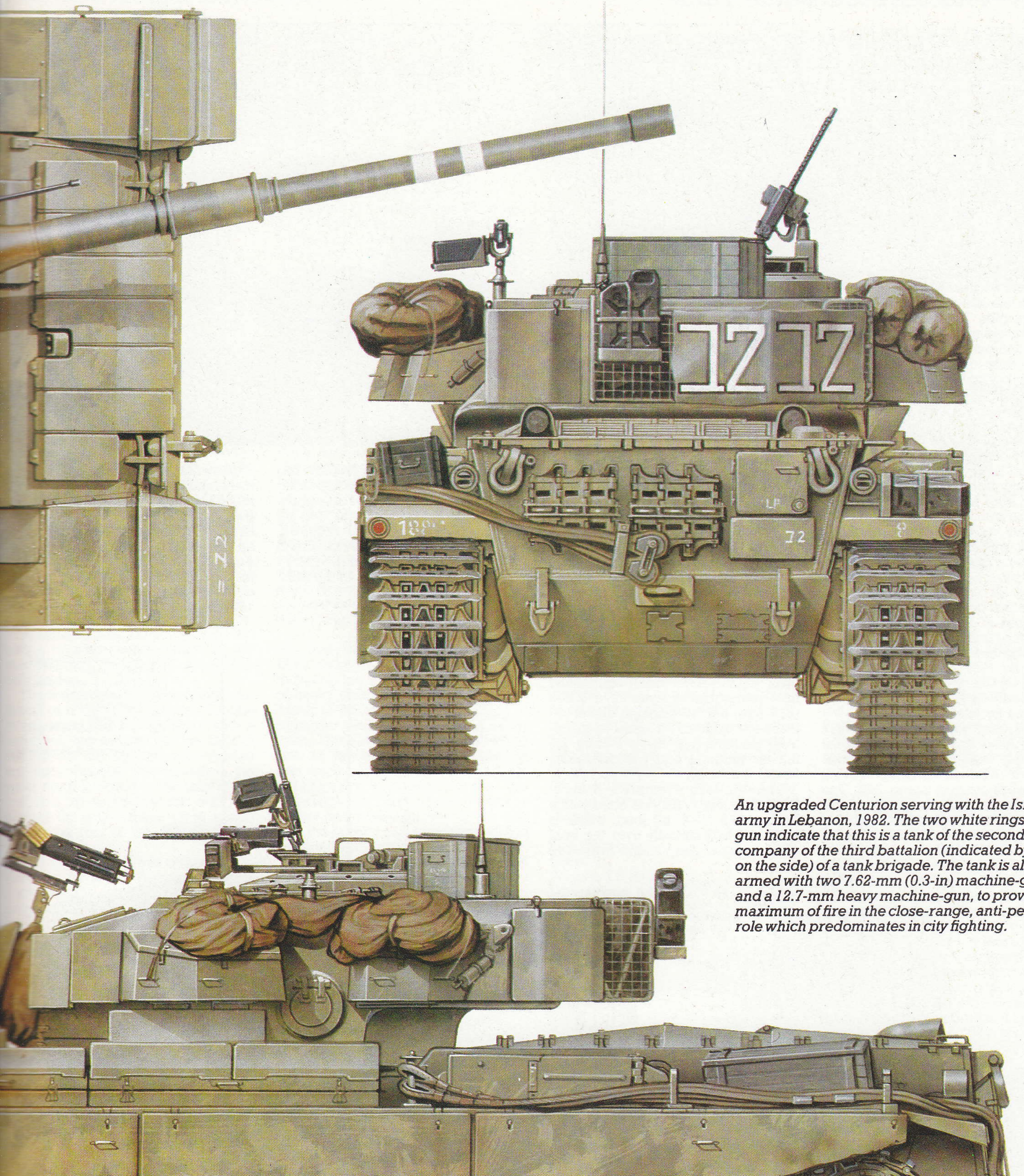

Keith Fretwell.

An upgraded Centurion serving with the Israeli army in Lebanon, 1982. The two white rings on the gun indicate that this is a tank of the second company of the third battalion (indicated by the 'V' on the side) of a tank brigade. The tank is also armed with two 7.62-mm (0.3-in) machine-guns and a 12.7-mm heavy machine-gun, to provide the maximum of fire in the close-range, anti-personnel role which predominates in city fighting.

UK

Vickers Main Battle Tank

Vickers' Elswick facility built many of the 4,423 Centurion MBTs built by 1961, but the company realized that for many countries Centurion's successor, the Chieftain, would be too heavy and too expensive. At about the same time the Indian army issued a requirement for a new MBT, and in 1961 the Vickers proposal was accepted. This was based on the company's private-venture design which had become known as the Vickers Main Battle Tank (VMBT). This used the proven 105-mm L7 series gun as well as some of the components of the Chieftain MBT, which was then about to enter production at both Royal Ordnance Factory Leeds and Vickers Elswick facility, including the 12.7-mm (0.5-in) ranging machine-gun, Leyland L60 engine, TN12 transmission, auxiliary engine, brakes and steering. The first two prototypes were completed in 1963 and by the following year a production line had been established in India, the first tank being completed in 1965 from components supplied by Vickers. But as time went on India produced more and more of the tank and by 1982 some 1,200 had been built, with production continuing. In 1968 Kuwait ordered 70 Vickers Mk I MBTs which were delivered between 1970 and 1972.

Vickers continued development of the tank with its own funds, the first stage being the replacement of the L60 engine by a Detroit Diesel, followed by a new all-cast turret with a welded bustle which could be fitted with different types of fire-control system. In 1977 Kenya ordered 38 Vickers Mk III MBTs plus three ARVs; these were delivered by 1980, and a second order was placed in 1978 for a further 38 MBTs plus four ARVs, all these being delivered by late 1982.

In 1981 Nigeria ordered 36 MBTs plus six ARVs and five AVLBs. These are being built at Vickers Defence Systems' new Armstrong Works, which were opened late in 1982. The famous old Elswick works, which produced armoured fighting vehicles and artillery pieces for some 100 years, has now been closed down and demolished.

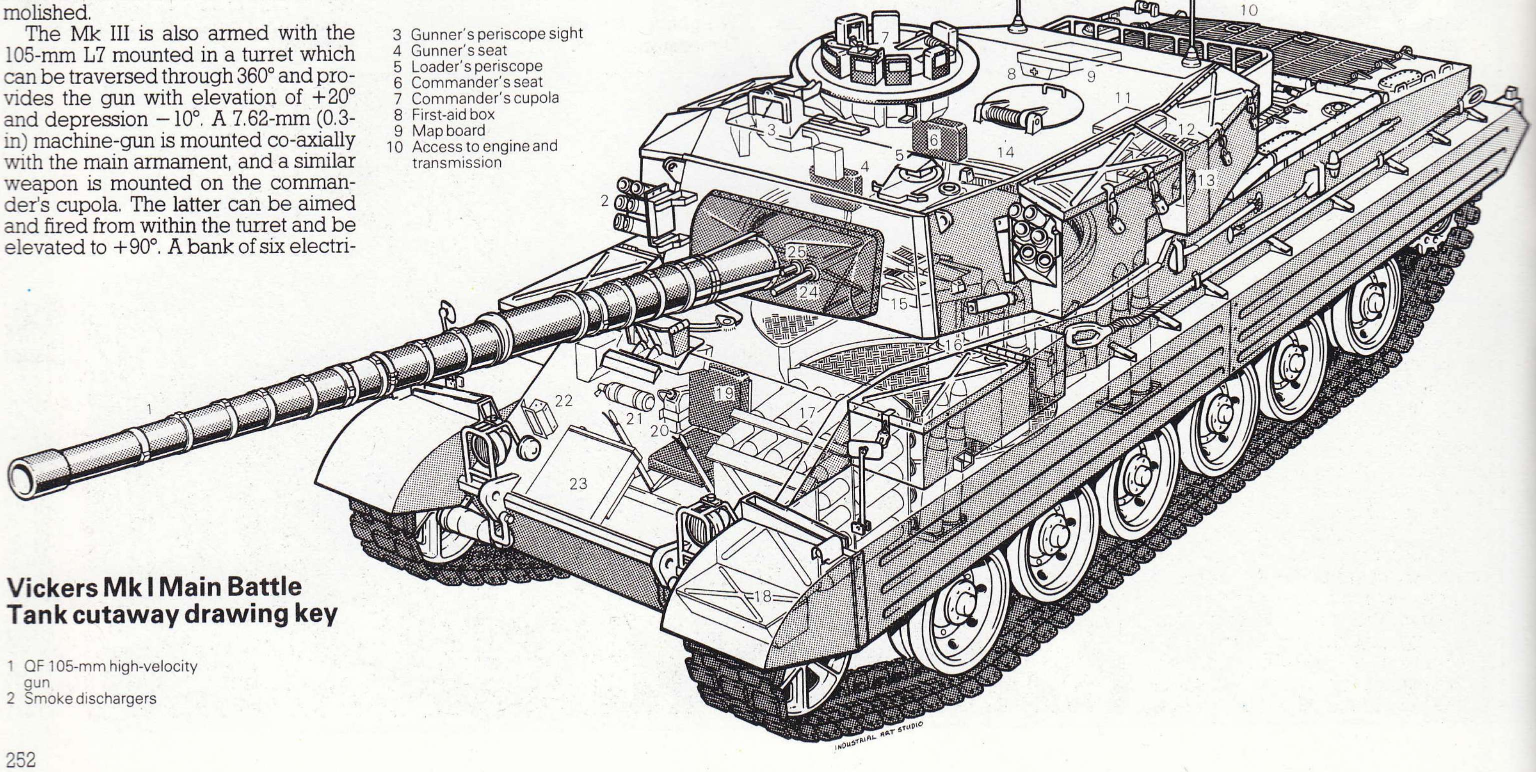
The Mk III is also armed with the 105-mm L7 mounted in a turret which can be traversed through 360° and provides the gun with elevation of +20° and depression −10°. A 7.62-mm (0.3-in) machine-gun is mounted co-axially with the main armament, and a similar weapon is mounted on the commander's cupola. The latter can be aimed and fired from within the turret and be elevated to +90°. A bank of six electrically-operated smoke dischargers is mounted on each side of the turret. The Nigerian vehicles are fitted with the Marconi Radar SFCS-600 (Simplified Fire Control System) which gives a high probability of a first-round hit. This system is now being fitted to some of the Indian Mk I MBTs. The commander has a Pilkington PE Condor day/night sight which enables him to lay and fire the main armament. As usual a whole range of optional equipment can be fitted to the Vickers Mark III MBT, including various radio installations, passive night-vision equipment, fire extinguishing system, a 0.5-in (12.7-mm) M2 HB machine-gun to replace the standard 7.62-mm (0.3-in) co-axial machine-gun, deep fording kit, full air filtration and pressurization, heater and so on.

The Vickers Armoured Bridgelaying Vehicle (VABV) is fitted with a bridge 44 ft (13.41 m) long, which is launched hydraulically over the front of the vehicle. The Vickers Armoured Recovery Vehicle (VARV) is provided with a front mounted dozer/stabilizing blade and a winch with a maximum capacity of 25 tonnes which can be increased to 65 tonnes if required. Some vehicles have a hydraulic crane to enable them to change powerpacks (engine and transmission) in the field.

Vickers Mk I MBT with turret traversed to the right firing its 105 mm L7 rifled tank gun during a demonstration at the Royal Armoured Corps gunnery range at Lulworth. The Mk I is in service with Kuwait and India and is also manufactured in the latter country under the name of the Vijayanta; over 1200 have been built there.

Vickers Mk I Main Battle Tank cutaway drawing key

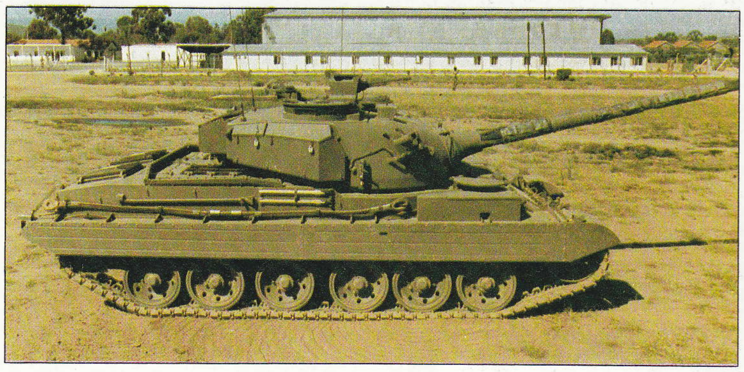
1 QF 105-mm high-velocity gun
2 Smoke dischargers
3 Gunner's periscope sight
4 Gunner's seat
5 Loader's periscope
6 Commander's seat
7 Commander's cupola
8 First-aid box
9 Map board
10 Access to engine and transmission
11 Literature stowage
12 7.62-mm (0.3-in) magazine stowage
13 Hand-grenade stowage
14 Slewing ring
15 7.62-mm (0.3-in) and 12.7-mm (0.5-in) ammunition feed tray
16 105-mm ammunition 6-round bin
17 105-mm ammunition 25-round bin
18 Anti-gas equipment bin
19 Driver's seat
20 Spray unit water bottle
21 Fire extinguisher
22 Sight stowage
23 Storage bin
24 12.7-mm (0.5-in) ranging machine-gun
25 7.62-mm (0.3-in) machine-gun



The hull of the Vickers Mk III MBT can also be fitted with the Vickers Shipbuilding and Engineering Limited turret armed with a 155-mm howitzer which can fire an HE round to a maximum range of 26,250 yards (24000 m), or to 32,800 yards (30000 m) with a rocket-assisted projectile (RAP).

Specification

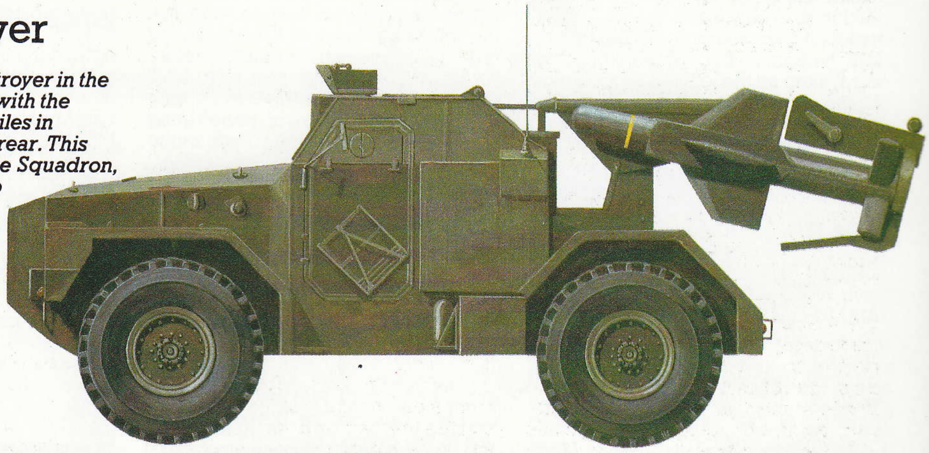
Crew: 4
Weight: 38.7 tonnes
Engine: 12-cylinder diesel developing 720 hp (537 kW)
Dimensions: length (with gun forward) 32 ft 1¾ in (9.788 m); length (hull) 24 ft 9¾ in (7.561 m); width 10 ft 4¾ in (3.168 m); height (overall) 10 ft 2 in (3.099 m)
Performance: maximum road speed 31 mph (50 km/h); range 375 miles (600 km); gradient 60%; vertical obstacle 3 ft 0 in (0.914 m); trench 8 ft 0 in (2.438 m)



Vickers Mk III MBT of the Kenyan army, who took delivery of 76 vehicles plus seven armoured recovery vehicles between 1979 and 1982. It is now in production for Nigeria, who have also ordered the ARV plus the bridgelayer tank. The Mk I is powered by the Detroit Diesel engine.

UK

Hornet Malkara tank destroyer



Hornet Malkara tank destroyer in the travelling configuration, with the launcher and its two missiles in retracted position at hull rear. This was used by the Parachute Squadron, Royal Armoured Corps to give airborne troops a long range anti-tank capability; it was replaced by the Ferret Mk 5 with the Swingfire missile system. For economic reasons the Parachute Squadron, Royal Armoured Corps has now been disbanded.

The **Hornet Malkara** weapon system was developed in the 1950s to give the Royal Armoured Corps a long-range anti-tank capability. At one time it was to have replaced the Conqueror heavy tank, but in the end it was only issued to the Parachute Squadron, Royal Armoured Corps, which used it until it was replaced in the 1970s by the Ferret Mk 5, which has four British Aerospace Dynamics Swingfire wire-guided ATGWs. The Parachute Squadron, RAC, consisted of a Squadron HQ; three guided-weapon troops each with a Ferret scout car, four Hornet Malkara launcher vehicles, a resupply vehicle and a REME resupply vehicle; a reconnaissance troop with six Ferrets; a missile resupply troop; an administration troop; and an REME attachment.

The Hornet Malkara essentially consisted of a modified Humber 1-tonne (4×4) armoured truck chassis with a launcher arm mounted at the rear of the hull for two Malkara wire-guided anti-tank missiles. For travelling the latter were lowered to the rear of the hull, but when the vehicle was deployed for action these were raised above the roof of the vehicle to fire over the cab.

The missile itself was developed in Australia by the Government Aircraft Factories, the Aeronautical Research Laboratories and the Weapons Research Establishment of the Australian Ministry of Supply, with the Royal Aircraft Establishment in England assisting. The co-ordinating design authority in England was the British Aircraft Corporation, later British Aerospace.

The operator was seated in the cab of the vehicle on the left, and he controlled the missile by a joystick which transmitted electrical signals along a wire unreeled from the missile sight. The operator observed the missile via a roof-mounted periscope sight with a magnification of ×10, and to assist him in keeping track of the missile the latter was fitted with flares. In addition the missile, which took 28 seconds to reach its maximum range of 4000 m (4,375 yards), could be launched up to 80 m (90 yards) away from the vehicle with the aid of a separation sight and controller. In addition to the two missiles in the ready-to-launch position, a further two missiles were carried; it took about two minutes to reload.

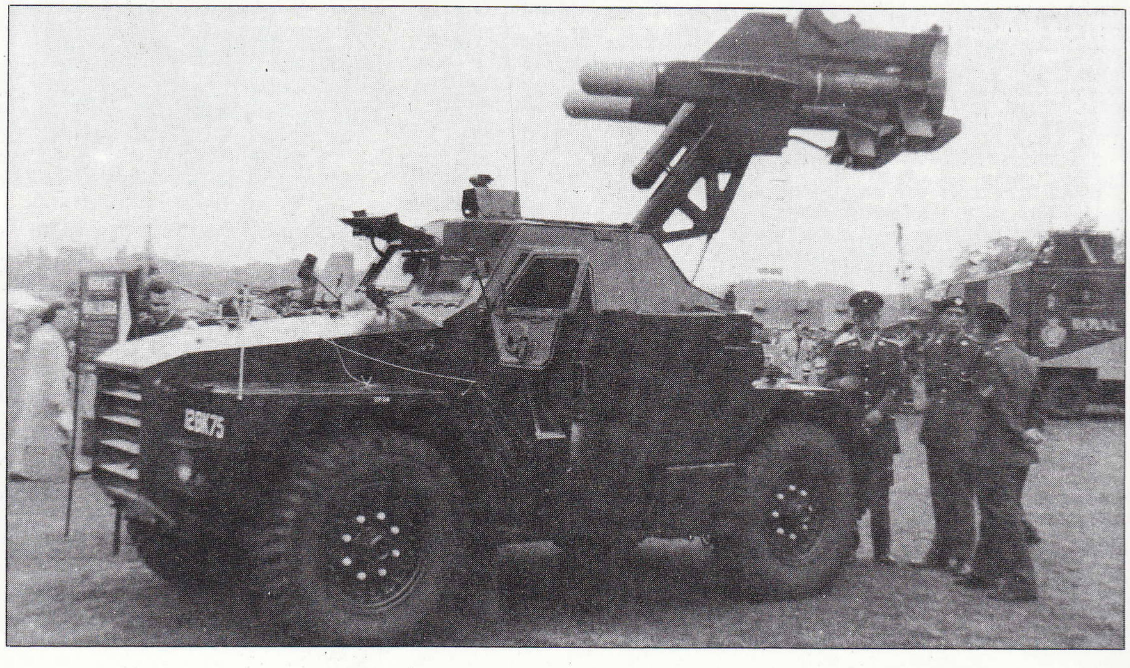
At launch the missile weighed just over 91 kg (200 lb), of which 27 kg (60 lb) comprised the HEAT warhead, which even today remains the largest warhead ever fitted to an ATGW system and would deliver a knock-out blow to any tank in service at that time, including the Soviet IS and T-10 series of heavy tank. The missile was about 1.98 m (6 ft 6 in) long, 20.32 cm (8 in) in diameter and 0.79 m (2 ft 7¼ in) in span. There were four forward wings (two for yaw and two for pitch, the former each being fitted with a flare for tracking) and four stabilizing fins. The two-stage solid-fuel booster/sustainer rocket motor was mounted at the rear with the bobbin and associated wire in the centre of the missile.

The Hornet Malkara was designed specifically for paradropping, and could be ready for action about 10 minutes after landing. Although it was never used in anger, many of the features of the missile system, such as the joystick control and very useful separated sight capability, were later used in the British Aerospace Swingfire ATGW system, which is today the standard long-range ATGW of the British army; at present this is manned by the Royal Artillery, although it could soon be transferred to the Royal Armoured Corps.

Specification

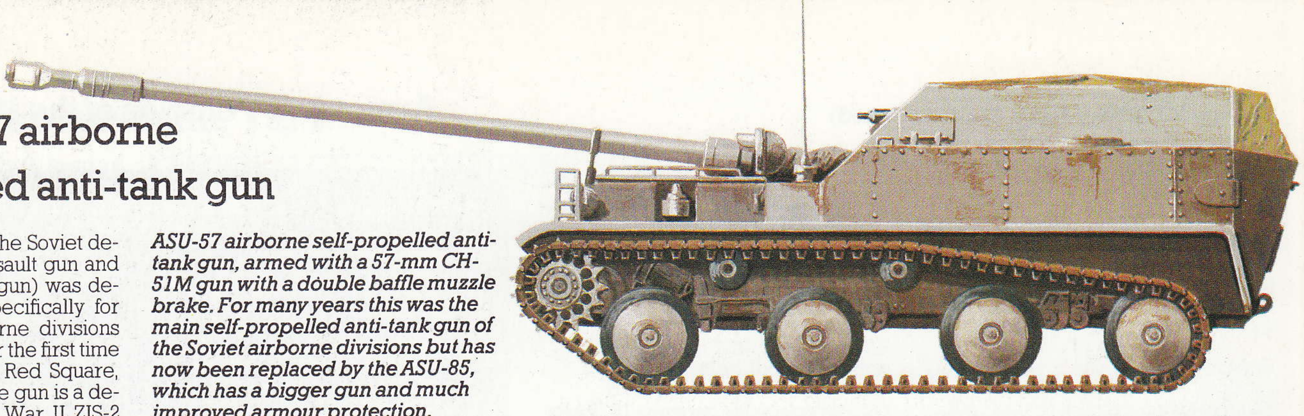
Crew: 3
Weight: 5.8 tonnes
Dimensions: length 5.05 m (16 ft 7 in); width 2.22 m (7 ft 3½ in); height 2.34 m (7 ft 8 in)
Powerplant: one Rolls-Royce B60 Mk 5A 6-cylinder petrol engine developing 120 bhp (89 kW)
Performance: maximum road speed 64 km/h (40 mph); maximum road range 402 km (250 miles); gradient 60 per cent; trench not applicable

Hornet Malkara tank destroyer with missiles in ready-to-launch position, and showing the optical sight in the roof of the vehicle. The missile could also be launched away from the vehicle.



USSR

ASU-57 airborne self-propelled anti-tank gun



ASU-57 airborne self-propelled anti-tank gun, armed with a 57-mm CH-51M gun with a double baffle muzzle brake. For many years this was the main self-propelled anti-tank gun of the Soviet airborne divisions but has now been replaced by the ASU-85, which has a bigger gun and much improved armour protection.

The **ASU-57** (ASU being the Soviet designation for airborne assault gun and 57 for the calibre of the gun) was developed in the 1950s specifically for use by the Soviet airborne divisions and was seen in public for the first time during a parade held in Red Square, Moscow, during 1957. The gun is a development of the World War II ZIS-2 M1943 anti-tank gun while its engine is from the Pobeda civilian car, and the vehicle may well be related to the OSU-76 self-propelled gun which was only developed to the prototype stage.

The hull of the ASU-57 is of welded aluminium construction with a uniform thickness of only 6 mm (0.24 in), which makes it very vulnerable. The engine is at the front on the right with the cooling system on the left and transmission at the very front. The open-topped crew compartment is at the rear with the driver and loader on the right, and the commander, who also acts as the gunner, on the left. Forward of the driver and commander is an armoured flap which contains two vision blocks; when the vehicle is not in the combat area this flap can be folded forwards to give improved vision. The top of the ASU-57 can be covered by a tarpaulin cover, and an unditching beam is often carried at the rear, this latter being a common feature on Soviet armoured vehicles. The torsion-bar suspension consists of four single rubber-tyred road wheels with the drive sprocket at the front and fourth road wheel acting as the idler, and two track-return rollers. The ASU-57 can ford to a depth of 0.7 m (28 in) but has no NBC system.

The vehicle is armed with a Ch-51 or Ch-51M rifled gun offset slightly from the vehicle's centreline. The Ch-51 was the first model to enter service and has a long barrel with a multi-slotted muzzle brake. This was followed by the Ch-51M, which has a shorter barrel with a double-baffle muzzle brake. Both weapons have a vertical sliding breech-block and hydro-spring recoil system, and fire the following types of fixed ammunition: HE fragmentation (muzzle velocity 695 m/2,280 ft per second), AP-T (muzzle velocity 980 m/3,215 ft per second and capable of penetrating 85 mm/3.35 in of armour at 0° at a range of 1000 m/1,095 yards), and HVAP (capable of penetrating 100 mm/3.94 in of armour at 0° at a similar range). A total of 30 rounds of ammunition is carried, and it is estimated that a well trained crew can fire a maximum of 10 rounds a minute. The gun has manual elevation and traverse, the former being from −5° to +12°, and the latter 8° left and 8° right. The vehicle is often used to carry four paratroops, and a 7.62-mm (0.3-in) machine-gun is carried. This can be dismounted for use in the ground role.

ASU-57 advances across the snow while in the background an 85-mm auxiliary propelled anti-tank gun is positioned. Note the unditching beam carried on the left side of the hull of the ASU-57, and the driver's head in an exposed position.

Each Soviet airborne division has three rifle regiments, and each of these had one battalion each with three six-gun batteries with ASU-57s, giving the division a total of 54 such weapons. In the USSR the ASU-57 is now used only for training as it has been replaced in front line use by the ASU-85, which not only has a more powerful gun but also much improved armour protection. It is interesting to note that the ASU-57 was developed at roughly the same time as the American M56 self-propelled anti-tank gun with its 90-mm gun.

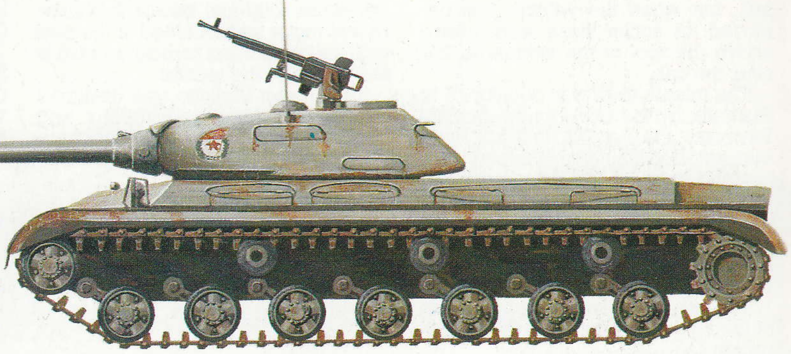
When originally introduced, the ASU-57 was packed in a special container and two of these were carried under a Tupolev Tu-4 heavy bomber, one under each wing. On the Antonov An-12 introduced in the late 1950s, two ASU-57s could be carried internally on individual pallets. Such pallets were provided with parachutes and a retro-rocket system to soften the impact on landing.

Specification

ASU-57 (with CH-51M gun)
Crew: 3
Weight: 3.35 tonnes
Dimensions: length (including gun) 4.995 m (16 ft 4⅔ in); length (hull) 3.48 m (11 ft 5 in); width 2.086 m (6 ft 10 in); height 1.18 m (3 ft 10½ in)
Powerplant: one M-20E 4-cylinder petrol engine developing 55 hp (41 kW)
Performance: maximum road speed 45 km/h (28 mph); maximum road range 250 km (155 miles); gradient 60 per cent; vertical obstacle 0.5 m (20 in); trench 1.4 m (4 ft 7 in)

USSR

T-10 heavy tank



T-10 heavy tank showing 12.7-mm DShKM anti-aircraft machine-gun on the commander's cupola. This tank has now been phased out of front-line service, although it is retained in reserve and would doubtless be issued in time of war, as would older tanks such as the R-34/85.

During World War II the USSR developed a series of heavy tanks including the IS-3 and IS-4 (alternatively JS-3 and JS-4) which were armed with a potent 122-mm gun firing separate-loading ammunition and were provided with excellent armoured protection. Post-war this basic type saw service in the Middle East with Egypt, and some captured by Israel in the 1967 war were then used for static defence on the Suez Canal against their former owners.

In the immediate post-war period the USSR continued the development of heavy tanks as did the United States (the M103) and the United Kingdom (the Conqueror), and among further prototypes built were the IS-5, IS-6, IS-7, IS-8 and **IS-9.** The last was accepted for service as the **T-10,** an improved later model being called the **T-10M.** It is believed that at least 2,500 production tanks were built before production was completed in the late 1950s. The T-10 was never exported, and none remains in front-line service today. But as the USSR never scraps its tanks, the T-10s are held in reserve for possible use in any future conflict. The main role of the T-10 was to provide long-range fire support for the T-54/T-55 tanks armed with 100-mm guns, and also perhaps to act as the spearhead of an armoured thrust through areas with a high degree of anti-tank defences, where the T-10's heavy armour protection would have proved most useful.

The hull of the T-10 is of rolled steel armour: the front is 230 mm (9.06 in) thick, the sides and upper front are 120 mm (4.72 in) thick, and the remainder of the hull varies from 20 mm to 80 mm (0.79 to 3.15 in) thick. The turret is all cast: the turret mantlet is 250 mm (9.84 in) thick, the sides are 100 mm (3.94 in) thick and the rear is 25 mm (1 in) thick. The driver is seated at the front of the hull and the other three crew members in the turret, with the commander and gunner on the left and the loader on the right. The engine and transmission are at the rear of the hull.

Main armament consists of a 122-mm gun that is provided with a double-baffle muzzle brake and a bore evacuator to remove fumes from the barrel. It fires separate-loading ammunition (projectile and charge) of the following types: APC-T which will penetrate 185 mm (7.28 in) of armour at 1000 m (1,095 yards), HEAT which will penetrate 460 mm (18.1 in) of armour at a similar range, and HE fragmentation which is used against troops in the open and other soft battlefield targets. Separate-loading ammunition had to be used as otherwise the complete round would have been too heavy and difficult for handling in the cramped confines of the turret. A total of 30 rounds (30 projectiles and the same number of charges) is carried. A 12.7-mm (0.5-in) DShKM machine-gun is mounted co-axial with the main armament, and a similar weapon is mounted on the loader's cupola for anti-aircraft defence.

The T-10 was succeeded by the T-10M, which has the following recognizable alterations: the 12.7-mm (0.5-in) DShKM machine-guns have been replaced by the more powerful 14.5-mm (0.57-in) KPV series, which is used in a number of other Soviet AFVs including the BRDM-2 (4×4) reconnaissance vehicle and the BTR-60PB (8×8) APC; the 122-mm gun has a multi-baffle muzzle brake in place of the double-baffle muzzle brake; the main armament is stabilized in both horizontal and vertical planes; infra-red night-vision equipment has been installed, as has an overpressure NBC system; and finally

T-10 heavy tank (continued)

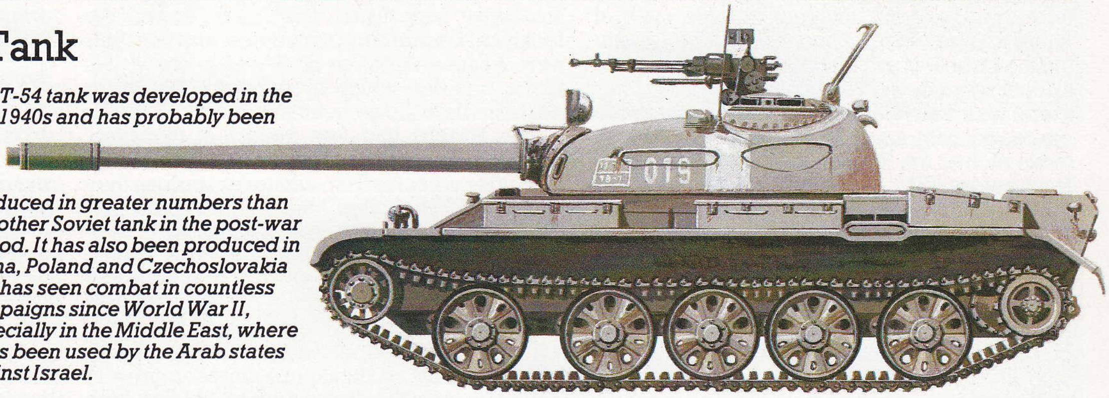
a large sheet-metal stowage box is often mounted externally at the turret rear. There are no known variants of the T-10 heavy tank, although several variants of the earlier IS-3 remain in service to this day.

Specification
Crew: 4
Weight: 50 tonnes
Dimensions: length (including gun) 9.875 m (32 ft 4¾ in); length (hull) 7.04 m (23 ft 1 in); width 3.566 m (11 ft 8½ in); height 2.25 m (7 ft 4½ in)
Powerplant: one V-12 diesel developing 700 hp (522 kW)
Performance: maximum road speed 42 km/h (26 mph); maximum road range 250 km (155 miles); gradient 62 per cent; vertical obstacle 0.9 m (35½ in); trench 3.0 m (9 ft 10 in)

T-10M heavy tank, which had its 12.7-mm machine-guns replaced by 14.5-mm KPVs, and has a multi-baffle muzzle brake for the 122-mm gun, infra-red night vision equipment for the commander, gunner and driver, and an overpressure system.

USSR

T-54 Main Battle Tank



The T-54 tank was developed in the late 1940s and has probably been produced in greater numbers than any other Soviet tank in the post-war period. It has also been produced in China, Poland and Czechoslovakia and has seen combat in countless campaigns since World War II, especially in the Middle East, where it has been used by the Arab states against Israel.

In 1946 the USSR designed a new medium tank called the T-44, and this was produced in small numbers between 1945 and 1949 although it was not considered to be a satisfactory design. In 1946 prototypes of a new design, the **T-54**, were completed and this type entered production several years later. The T-54 and its variants were built in larger numbers than any other Russian tank to appear after World War II, and by the time production of the improved **T-55** was completed in 1980-1 it is estimated that well over 50,000 vehicles had been built. The series was also built in Czechoslovakia and Poland for both the home and export markets, while the Chinese produced an almost identical version designated Type 59. Further development of the T-54 and T-55 resulted in the **T-62**.

The T-54 has an all-welded hull divided into three compartments (driver's at the front, fighting in the centre, and engine and transmission at rear). The driver is seated at the front of the hull on the left and steers the tank with conventional sticks. An unusual feature of the T-54 is that it has a 7.62-mm (0.3-in) machine-gun fixed in the centre of the glacis plate to fire forwards, this being fired when the driver presses a button on his right steering lever. The commander and gunner are seated on the left of the turret, with the loader on the right. The turret is a casting with the top welded into position. One of the major weaknesses of the T-54 series has been its engine and transmission, which have proved very unreliable in service.

The main armament consists of a 100-mm gun, which was developed from a naval weapon of the same calibre and also used in a modified form in the SU-100 tank destroyer developed in World War II. A well-trained crew can fire about four rounds per minute, and the types of ammunition that can be fired includes AP-T, APC-T, HE, HE-FRAG, HEAT-FS and HVAPDS-T. The last was introduced some time after the T-54 entered production and will penetrate well over 200 mm (7.9 in) of armour at a range of 1000 m (1,095 yards). A total of 34 rounds of 100-mm ammunition is carried, a poor quantity when compared with contemporary Western tanks. One of the major drawbacks of the T-54 family is that the main armament can only be depressed to −4°, which makes firing from a hill or reverse slope almost impossible. A 7.62-mm (0.3 in) SGMT is mounted co-axially with the 100-mm gun, and a similar weapon is mounted in the bow. A 12.7-mm (0.5-in) DShKM anti-aircraft machine-gun is mounted on the loader's hatch. The tank does not have smoke dischargers as it can lay its own smoke screen by injecting diesel fuel into the exhaust pipe on the left side of the hull just above the track.

The basic T-54 was improved as the years went by. The **T-54A** included stabilization of the 100-mm gun in the vertical plane. The **T-54B** was the first production model to incorporate infra-red night-vision equipment, subsequently retrofitted to earlier vehicles, and its armament was stabilized in both the horizontal and vertical planes. The **T-54C** was not fitted with an AA MG, although such a weapon was refitted at a later date. The T-55 succeeded the T-54 in production in the late 1950s and has numerous improvements including more ammunition stowage, new 7.62-mm (0.3-in) machine-guns, and improved NBC protection. There have been countless versions of the T-54 family, including a flamethrower tank, armoured recovery vehicles (including Russian, Polish and Czech versions), bridgelayers (built by East Germany, Czechoslovakia and the USSR), dozer tanks, a combat engineer vehicle fitted with an hydraulic crane and front-mounted dozer blade, and mine-clearing vehicles fitted with rollers, ploughs and rocket-assisted devices, to name but a few. In recent years the T-54/T-55 series has been fitted with improved fire-control systems, including an externally mounted laser rangefinder.

The T-54/T-55 series has seen extensive combat in the Middle East, North Africa, Angola and the Far East. On a one-for-one basis Western tanks of the same period, such as the British Centurion and American M48, have proved more than a match for the T-54/T-55, especially during the fighting between Israel and Egypt and Syria.

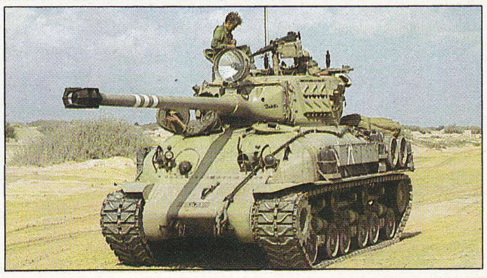
Specification
Crew: 4
Weight: 36 tonnes
Engine: V-12 diesel developing 520 hp (388 kW)
Dimensions: length (with gun forward) 9 m (29 ft 6⅓ in); length (hull) 6.45 m (21 ft 2 in); width 3.27 m (10 ft 8¾ in); height (turret roof) 2.4 m (7 ft 10½ in)
Performance: maximum road speed 48 km/h (30 mph); maximum range 400 km (249 miles); fording 1.4 m (4 ft 7 in); gradient 60%; vertical obstacle 0.8 m (2 ft 7½ in); trench 2.7 m (8 ft 10¼ in)

Soviet T-54 series tanks lined up in a street in Prague during the unrest in Czechoslovakia in 1968. The white stripes have been a common marking on Soviet vehicles when invading other countries.

Soviet T-54 with turret traversed to the rear, and the loader manning the 12.7-mm DShKM anti-aircraft machine-gun. The tank can also lay its own smokescreen by injecting diesel fuel into the exhaust outlet.

Armoured Warfare in the Middle East 1948-67

Together with the aeroplane, the tank has become the dominant symbol of warfare in the Middle East. Israel, often faced with seemingly overwhelming opposition, has had to evolve an armoured force equal to any threat. As a result of this military prowess, Israel has become the dominant force in the area. However, during the early years of the state of Israel things were very different.



Israeli M51 Sherman, with a modified turret armed with a French 105-mm gun and 7.62-mm co-axial and 12.7-mm anti-aircraft machine-guns. The searchlight is mounted above the mantlet for target illumination at night.

The War of Independence, which Israel had to fight from the very moment that the state of Israel was proclaimed, was fought mainly without the benefit of armour. Some tanks and other armour were indeed involved, but this involvement was very limited. The Syrians were equipped with small numbers of old French tanks such as the Renault R-35, but these dated from before 1940 and were little suited to the mobile warfare that was prevalent in 1948 and 1949. The newly-formed Israeli army did obtain a small number of Comet tanks that were stolen or purchased from defecting British soldiers, but the mobile warfare that took place all around the borders of the new state was primarily the task of Jeep-carried infantry armed with little more than small arms. These Jeep units acted as independent mobile columns, backed up in some cases by hastily-converted armoured cars produced by adding steel plate to truck and bus chassis.

The mobile columns produced results totally out of proportion to their numbers. Using deep-penetration tactics, these mobile columns progressively struck deep into the rear areas of their Egyptian, Syrian and Jordanian foes and wrought havoc.

By the end of 1949 the Israeli state was established and its foes routed, at least for the moment. Israel had to arm itself for the renewed hostilities that all thinking Israelis knew would come. Syria and Egypt gradually fell under the influence of the Soviet Union and began to receive numbers of modern Soviet tanks. What they did not receive was the education that went with such weapons, so while it looked good in parades this new Arab strength was somewhat superficial. The Arabs lacked the technical background to maintain and use their new weapons and, as time was to show, this factor was one which enabled the Israelis to maintain their edge over the Arabs.

The Israelis had few friends at that time. During the early 1950s they had to obtain tanks and other vehicles from whatever sources they could find. That often meant scrapyards, and gradually the Israelis assembled a small nucleus of M4 Sherman tanks of various marks, some armed with old types of gun. But it was a start. The new state attracted immigrants many of whom had technical experience and some of whom even had experience of armoured warfare. Using the small nucleus that soon grew to about 50 M4s, the Israelis were able to form new tank units backed by numbers of old American half-tracks that gradually replaced the Jeeps as personnel carriers.

Doctrinaire disadvantage

The equipment breakthrough came for the Israelis in 1954 when the French delivered to Israel 100 new AMX-13 light tanks armed with high-velocity 75-mm (2.95-in) guns. Some of the new guns were immediately switched to M4 Sherman turrets and so by the start of the 1956 campaign the Israeli army had three armoured brigades formed from AMX-13s, various forms of M4 and some 200 half-tracks. Their opponents had the formidable Soviet T-34/85, but not all the Arab armour was modern: the Syrians still had numbers of old World War II German PzKpfw IVs. Lacking as they did the technical expertise of the Israelis, the Arab armies relied on tactical doctrines that emphasized the static and defensive, which was to prove to be exactly what the Israelis wanted.

That proof came during what is now known as the Suez Campaign of 1956. Operating in concert with the French and British forces, the Israelis moved forward into the Sinai Desert and the Gaza Strip. Using a combination of paratroop actions, air strikes and constant movement the Israelis soon isolated the Egyptian forces in the Gaza Strip and moved forward rapidly into Sinai proper. To a large extent the Egyptian armoured units were rendered impotent by an imposed doctrine of 'hedgehog' defensive positions into which the T-34/85s were laagered. Inside these positions they were largely dug-in to act as armoured pillboxes. This was not purely imposed doctrine as the Egyptian tank crews were at that time suited for little else. They suffered under an autocratic command structure that had little flexibility and allowed few movements to be made without deliberation and delay. Few of the Egyptian

Israel obtained its M48 tanks from West Germany and the United States. Most of these now have the 105-mm gun in place of the 90-mm gun and a diesel engine. They are equivalent to the American M48A5.

tank crews had the expertise to operate their charges without supervision or even to maintain their vehicles. Consequently the initiative soon passed to the Israelis, who swept past the defended positions, captured the essential passes through the western Sinai and rapidly moved south to capture the port of Sharm-el-Sheik on the Red Sea. To the north Israeli tanks were on the banks of the Suez Canal but then the French and British forces were forced by international reaction to halt their campaign. The Israelis were also involved in the resultant cease-fire but by then their campaign was over. The battered and confused Egyptian hedgehogs were forced into submission by being starved of stores and food, and their precious T-34/85s fell into Israeli hands.

The Syrians and the Jordanians made few contributions to the Suez campaign, but the Israelis captured several PzKpfw IVs that had been dug in as pillboxes.

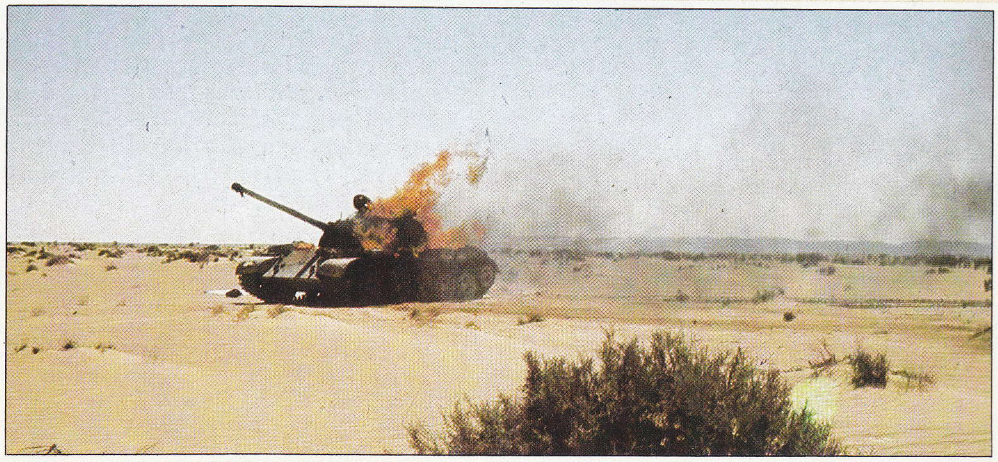
Under the terms of the imposed cease-fire the Israelis had to retreat from all their hard-won gains, but what they had gained from the campaign was a new confidence in their ability to conduct armoured warfare. The Suez campaign in the Sinai had not been all headlong advances: here and there the Egyptians had attempted to put up some form of armoured fight, but the Israelis had then demonstrated a tactical skill that enabled them to out-gun and out-manoueuvre their opponents. They revealed a national talent for armoured warfare at all levels from tank gunnery to brigade tactics that was to place them in the forefront of armoured thought for the future.

Long-term balance

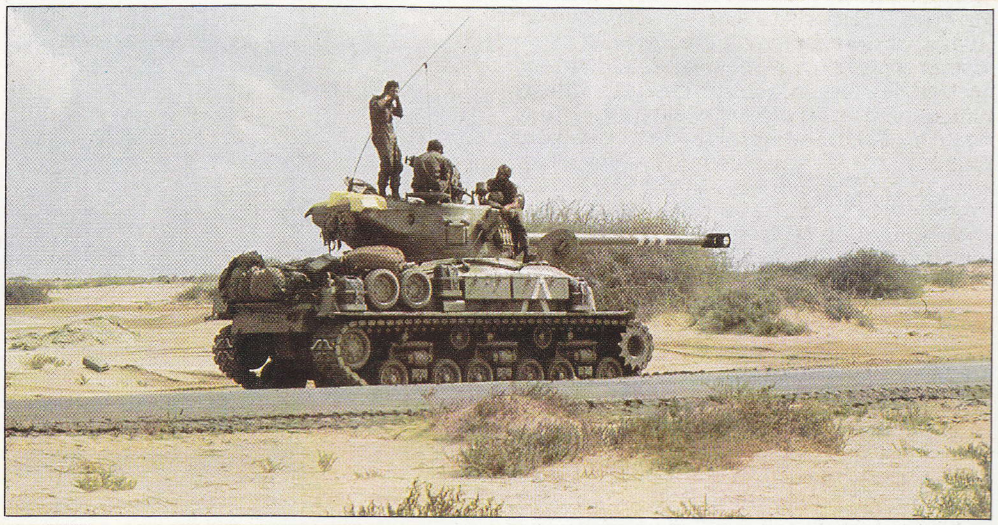
The Suez campaign also brought the Israeli state into the American sphere of influence. After 1956 the United States began to provide Israel with new weapons that ranged from yet more half-tracks to modern M48 Patton tanks. More tanks came from the United Kingdom, in the form of a large purchase of Centurion tanks which remain the backbone of the Israeli armoured brigades up to the present day. Aircraft and artillery also started to flow to Israel, but as their strength increased so did that of the Arabs. The Soviet Union balanced the Israeli increase in strength and even exceeded it. Syria and Egypt received floods of arms of all kinds and this time Soviet advisers came with the weapons to show the Arabs how to use them. Vast training schemes at all levels showed the Arab armies not only how to maintain armoured forces but also how to use them en masse. Within a few years the Egyptians and Syrians were once again carrying out border raids and shelling Israeli territory. At times these raids grew into miniature armoured conflicts with the Israelis usually getting the upper hand and learning all the time how to use their forces to the best advantage.

The raids gradually increased in strength and regularity as the Palestine Liberation Organization (PLO) guerrillas became increasingly involved. Things got to such a pitch that in the end the Israelis came to consider pre-emptive action. It came in June 1967.

The 1967 campaign became known as the Six-Day War. It started with a rapid series of pre-emptive air strikes by the Israeli air force on Egyptian and Syrian air bases to knock out the bulk of Arab air power and render its bases unfit for operations. While Israeli naval units bombarded the coastal strip three Israeli armoured formations of one or two armoured

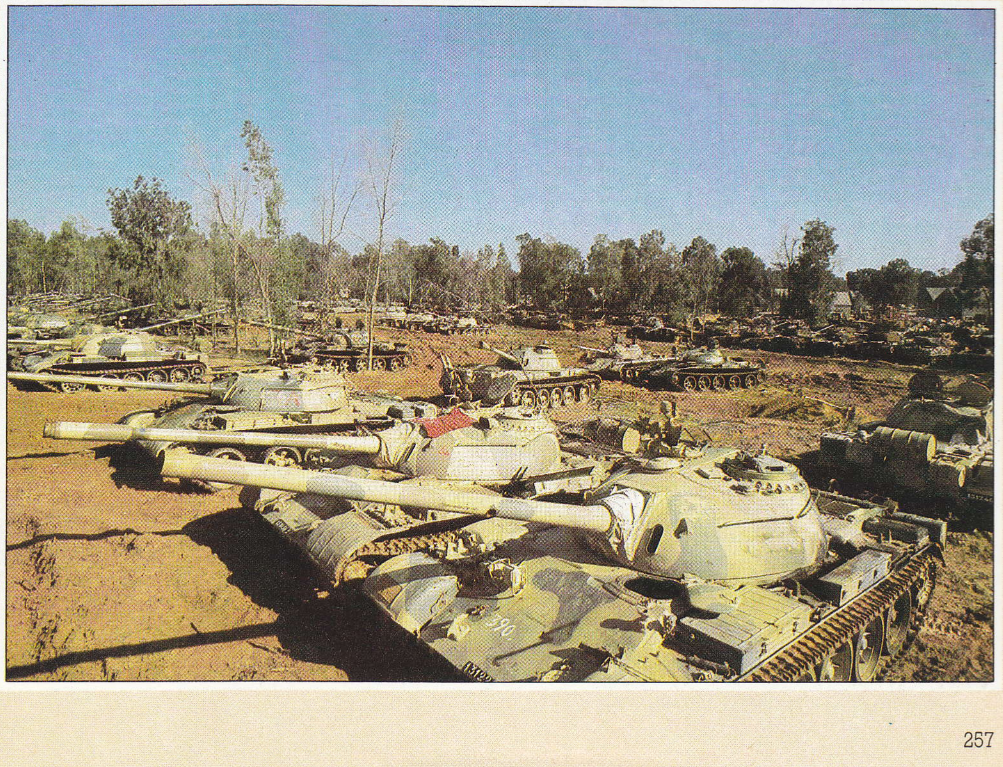


Soviet-supplied T-54 ablaze. Fire is still the greatest fear of a tank crew; new tanks are now fitted with a fire suppression system for crew and engine compartments.



Above: M51 Sherman was based on the M4A1 chassis with HVSS suspension. In addition to the new M51 gun it has numerous other modifications including a Cummins diesel, modified suspension and a new French SAMM gun control system.

Below: A graveyard of captured T-54 tanks somewhere in Egypt. Some of these were rebuilt by the Israelis, with a new power pack and standard 105-mm M68 gun, as fitted to their M48, M60, Centurion and Merkava tanks.



The Six-Day Tank War

Although assisted by pre-emptive and continuous air strikes, Israel's tank crews had nonetheless the awesome task of fighting on three fronts against the enormous combined might of many Arab armies. Using courage, skill, improvisation and guts, they turned and routed their enemies and enacted one of the most spectacular victories ever seen in the history of tank warfare.

brigades each struck deep into Sinai. These brigades advanced against several Egyptian positions that had been fortified in Soviet style. It was the function of these positions to delay any Israeli advance until the new Egyptian armoured divisions could come forward. They never had such a chance, however, for the Israelis moved with such speed that they were able to fall on their unprepared foes before they were fully ready. Some fighting did take place around the fortified zones but the main armoured conflict took place around Rafah south of the Gaza Strip, which resulted in an Israeli victory after a desperate five-hour fight. This Israeli success bottled up the bulk of the Egyptian forces in the Gaza Strip for later neutralization by a specially-formed infantry/tank brigade.

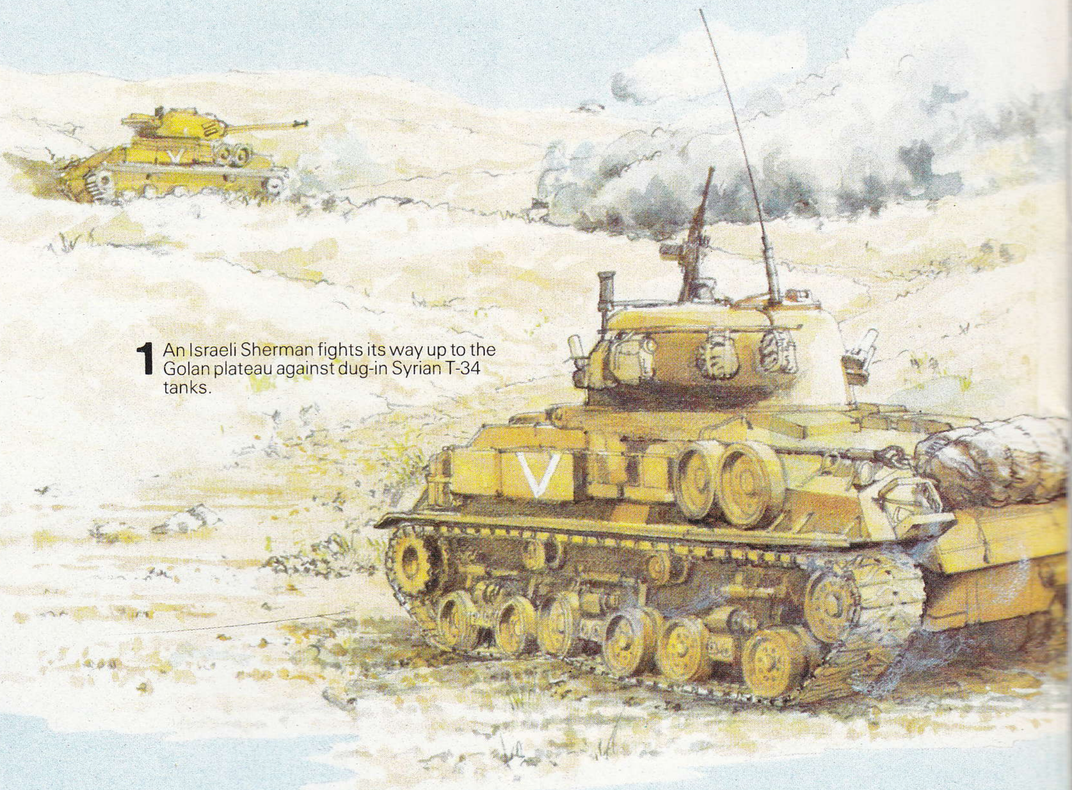
A further fight at Um Katef opened up Sinai to the Israeli advances. Tank units moved west and south, supported by the Israeli air force which trapped advancing Egyptian columns in the Giddi Pass, where they were annihilated. The advances chopped up the Egyptian forces to such an extent that whole units fell apart and tried to move west through the desert; many thousands died of starvation or thirst on their way. Once again Israeli tanks stood on the Seuz Canal.

Jordan joins in

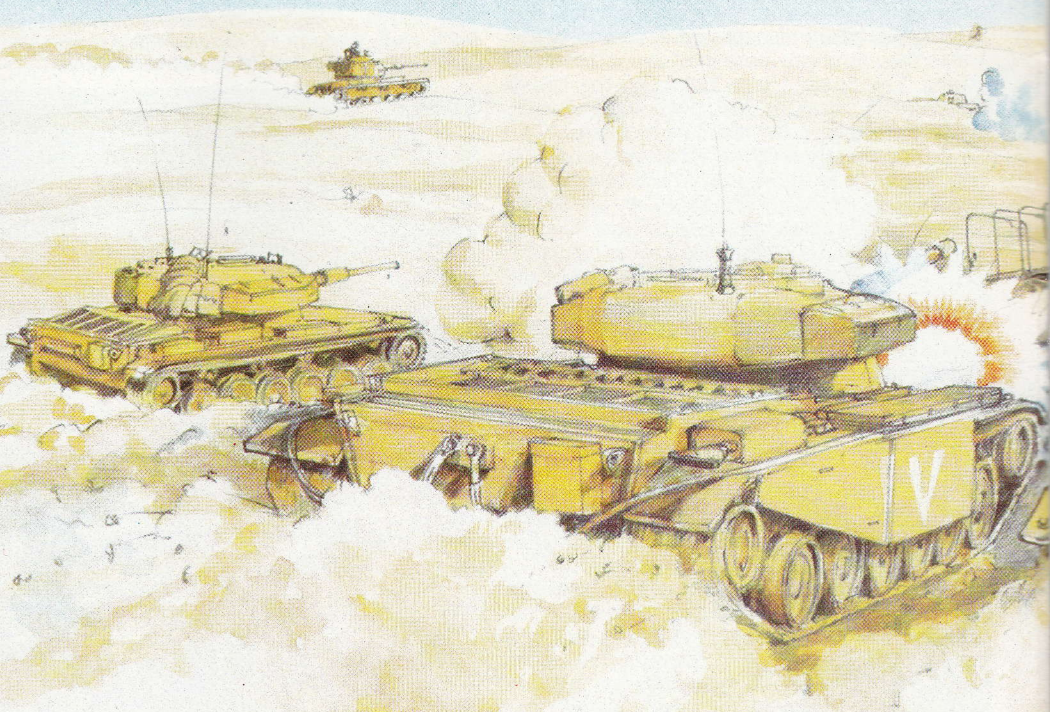
This time Jordan became involved in the campaign and the excellent Jordanian armoured units proved to be a tough nut to crack. But a combination of audacious tactics, good gunnery and combined operations with the Israeli air force resulted in the Israelis entering Jerusalem for the first time since 1949. To the north the battle in the Golan Heights was mainly an infantry one with armoured units, mainly the older M4 Shermans, in support. The Syrians did attempt some massed attacks using T-34/85s, but they were repulsed by a combination of tank tactics and air support. The Syrian infantry gradually won its way across the heights that dominate the whole of northern Israel, the culmination of the Syrians' fight being the taking of Mount Hermon by a combined armour/infantry force. Soon after that the Syrians disintegrated and whole units fled towards Damascus with Israeli tanks and half-tracks in pursuit.

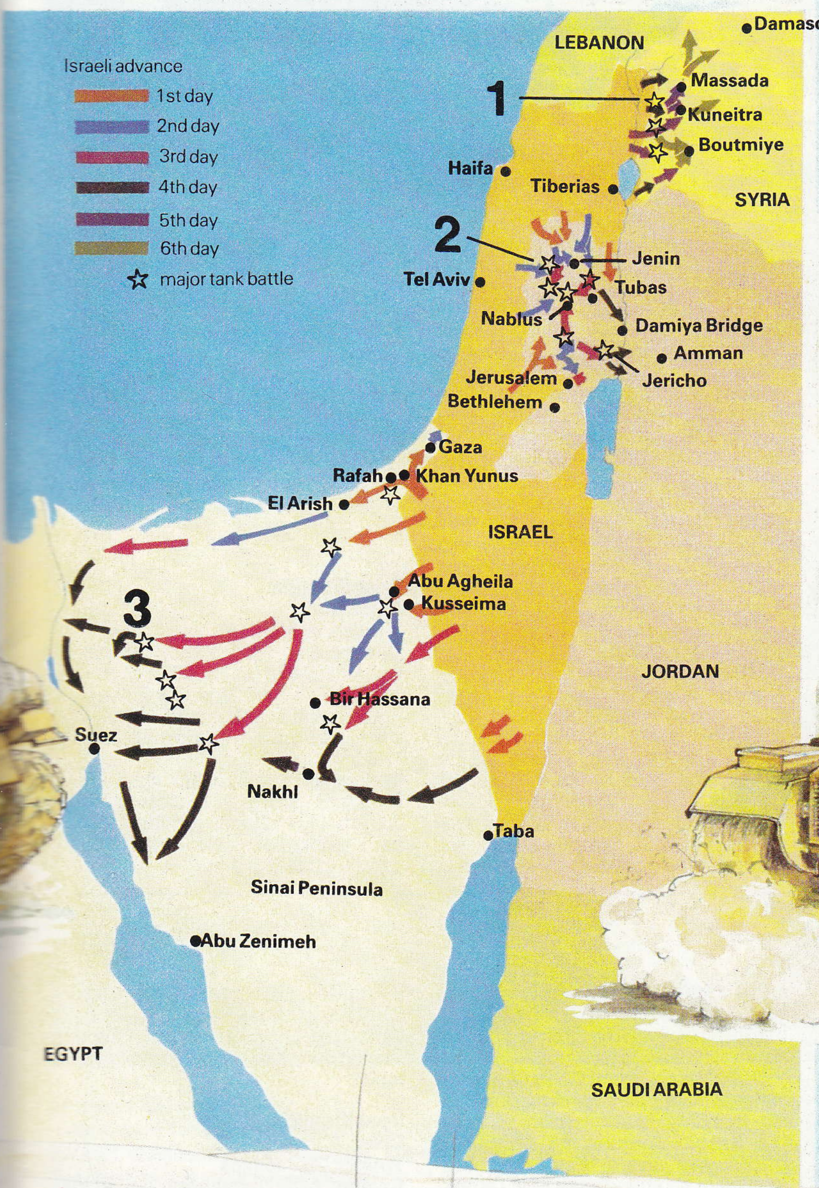
In both Sinai and the Golan Heights the pile of war booty that fell to the Israelis was enormous. Large numbers of T-54/55 tanks were immediately taken into Israeli use and this time the territorial gains were kept. The whole of Sinai became a vast Israeli training ground and base while the Golan Heights were fortified against further incursions. But the Israeli nation was to learn that its Six-Day War, despite its remarkable achievements, could not bring peace. The cease-fire sponsored by the United Nations left the Syrians, Egyptians and the whole Arab world as implacable as ever. The Soviet Union soon replaced all the lost weapons and equipment, and the guerrillas continued their raids as fervently as before.

All the same, the Six-Day War was a remarkable victory for the Israelis. Once again they had demonstrated their tactical supremacy and flair for armoured warfare. They had taken on the whole of the Arab world and won. They won more territory, a huge pile of weapons and the respect of the world. At the time they did not realize they had not won the most essential prize of all, and that was peace. That realization was to come in 1973 with the Yom Kippur War.

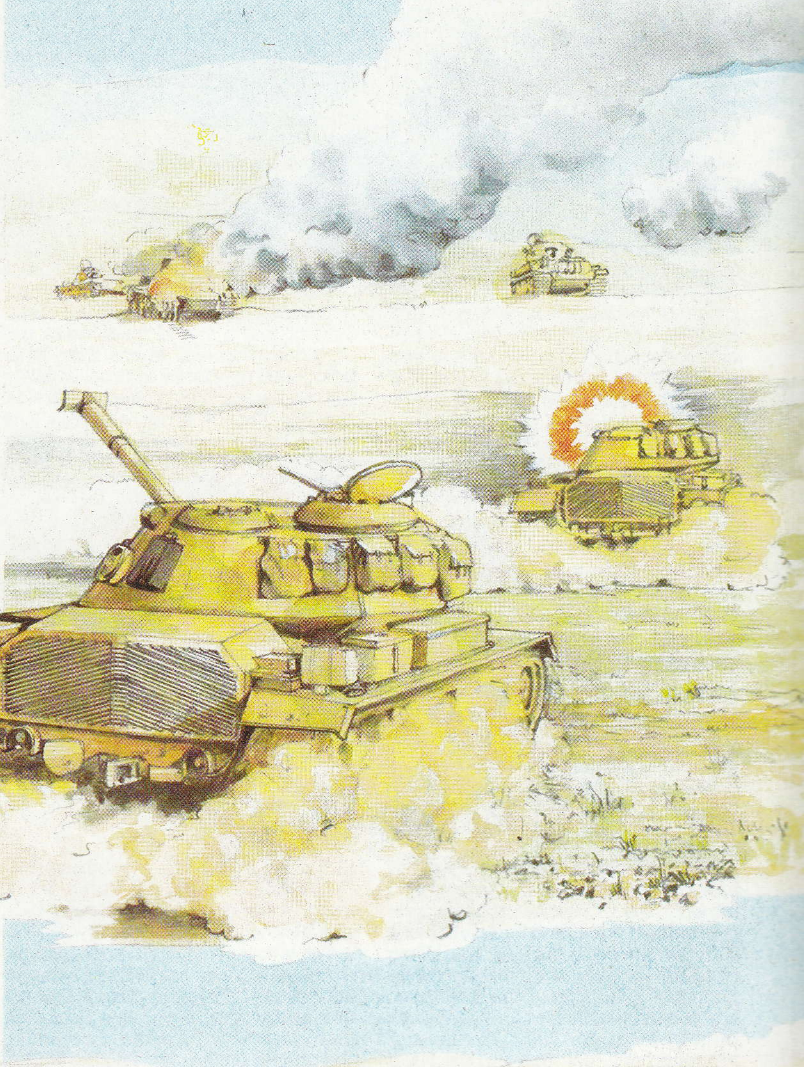


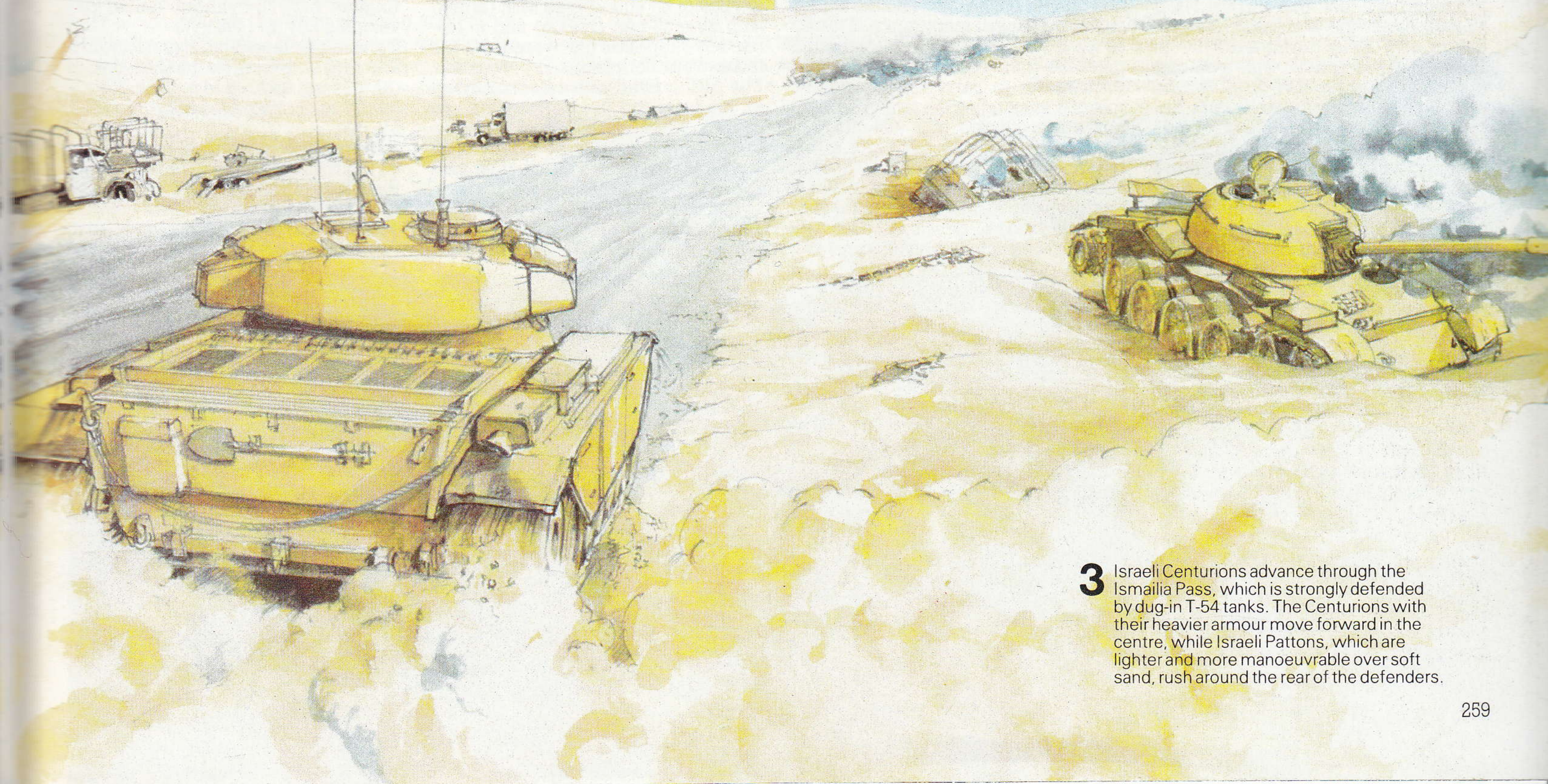
1 An Israeli Sherman fights its way up to the Golan plateau against dug-in Syrian T-34 tanks.




Israeli advance
1st day
2nd day
3rd day
4th day
5th day
6th day
☆ major tank battle
LEBANON
Damascus
1
Massada
Kuneitra
Boutmiye
Haifa
Tiberias
SYRIA
2
Jenin
Tel Aviv
Tubas
Nablus
Damiya Bridge
Amman
Jerusalem
Jericho
Bethlehem
Gaza
Rafah
Khan Yunus
El Arish
ISRAEL
Abu Agheila
Kusseima
3
JORDAN
Bir Hassana
Suez
Nakhl
Taba
Sinai Peninsula
Abu Zenimeh
EGYPT
SAUDI ARABIA

2 Israeli Sherman tanks have suffered heavy casualties inflicted by Jordanian Pattons positioned in olive groves. When the Israeli force retreats to regroup, the Pattons break cover and follow, a running battle ensues and a narrow victory for Israel results.



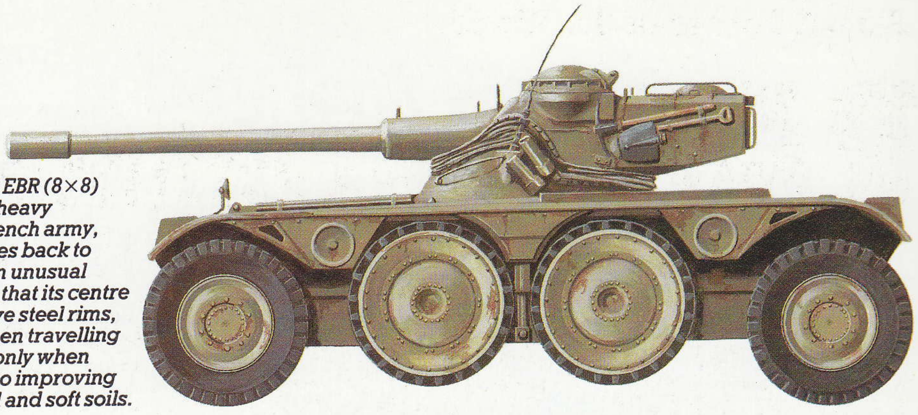


3 Israeli Centurions advance through the Ismailia Pass, which is strongly defended by dug-in T-54 tanks. The Centurions with their heavier armour move forward in the centre, while Israeli Pattons, which are lighter and more manoeuvrable over soft sand, rush around the rear of the defenders.

FRANCE

EBR heavy armoured car

The Panhard EBR (Engin Blindé de Reconnaissance, or armoured reconnaissance vehicle) has the distinction of being probably the oldest design of armoured car still in service in the world today. Its origins can be traced to 1937, when Panhard and Levassor of Paris started design work on a new armoured car that would have superior cross-country mobility to the 4×4 armoured cars then in use with the French army. The first prototype was completed in 1939 and was armed with a 25-mm cannon and a co-axial 7.5-mm (0.295-in) machine-gun. Its most unusual feature was that of its eight road wheels, the four centre ones (two on each side) were fitted with steel rims for improved traction. For road use these were raised clear of the ground by a hydro-pneumatic unit operated by the driver, and lowered again when crossing country. The prototype was taken to North Africa when World War II broke out, and its eventual fate is unknown.



Since 1950 the Panhard EBR (8×8) has been the standard heavy armoured car of the French army, although its design dates back to before World War II. An unusual feature of the vehicle is that its centre road wheels, which have steel rims, are normally raised when travelling on roads and lowered only when going across country, so improving ground traction in mud and soft soils.

After the end of the war the French army issued a requirement for a new heavy armoured car and, after a number of proposals from French companies had been studied, Panhard and Levassor was awarded a contract for an 8×8 vehicle while Hotchkiss was awarded a contract for a 6×6 vehicle. Each company built two prototypes for evaluation by the French army, and the Panhard and Levassor vehicle was subsequently selected for service as the EBR. The first production vehicles were completed in 1950. Production was completed in 1960 after some 1,200 vehicles had been built. In addition to the French army, the type was also exported to Mauritania, Morocco and Tunisia. An armoured personnel carrier version, the **EBR VTT**, was also developed by Panhard on the same chassis, and a few of these were exported to Portugal where they have been used mainly for internal security use. Today the EBR remains in service with the French army, although it is slowly being replaced by the much more sophisticated and expensive AMX-10RC (6×6) armoured vehicle which is also amphibious. It is expected that the EBR will not finally be phased out of service until 1987, some 50 years after it was first designed.

The driver is seated at the front, with commander and gunner in the centre of the vehicle, the engine in the floor and the second driver at the rear. The EBR is fitted with an FL-11 oscillating turret armed with a 90-mm gun, 7.5-mm (0.295-in) co-axial machine-gun and two banks of two electrically operated smoke-dischargers. In an oscillating turret the gun is fixed in the upper part of the turret which pivots on the lower part of the turret. The 90-mm gun fires the following types of fixed ammunition: HEAT (muzzle velocity 640 m/2,100 ft per second), high explosive (muzzle velocity 635 m/2,085 ft per second), smoke (muzzle velocity 750 m/2,460 ft per second) and canister for close defence. A total of 43 rounds of 90-mm and 2,000 rounds of 7.5-mm (0.295-in) ammunition is carried. Another unusual feature of the EBR is that the drivers at the front and rear are each provided with a fixed 7.5-mm (0.295-in) machine-gun firing forwards, although in peace time this is rarely fitted. As with many armoured vehicles developed in the 1950s, the EBR is not fitted with an NBC system and has no infra-red night-vision equipment.

Some vehicles were fitted with the FL-10 turret of the AMX-13 light tank armed with a 75-mm gun fed by two revolver type magazines, each holding six rounds of ammunition. These allowed 12 rounds to be fired very quickly, after which the magazines had to be reloaded manually from outside the vehicle. The main drawback of this combination was that the weight of the vehicle went up to over 15 tonnes, while overall height also increased and so facilitated detection in the field.

Specification

Crew: 4
Weight: 13.5 tonnes
Dimensions: length (gun forwards) 6.15 m (20 ft 2 in); width 2.42 m (7 ft 11¼ in); height 2.32 m (7 ft 7⅓ in)
Powerplant: one Panhard 12-cylinder petrol engine developing 200 hp (149 kW)
Performance: maximum road speed 105 km/h (65 mph); maximum range 650 km (404 miles); gradient 60 per cent; vertical obstacle 0.4 m (15¾ in); trench 2.0 m (6 ft 7 in)

SWITZERLAND

Pz 68 Main Battle Tank

Like many other countries after the end of World War II, Switzerland turned to the UK to meet its immediate needs for a MBT and ordered some 200 Centurions, a further 100 being obtained from South Africa. The Federal Construction Works at Thun, which had already designed and built prototypes of the NK I 75-mm self-propelled anti-tank gun and the NK II 75-mm assault gun, completed the prototype of a Swiss designed MBT in 1958. This was armed with a 90-mm gun and called the **KW 30**; a second prototype was completed in 1959. Between 1960 and 1961 10 pre-production tanks were built under the designation **Pz 58**; these were armed with the British 20-pounder gun as then installed in the Centurion. In 1961 an order was placed for 150 production vehicles armed with the 105-mm L7 gun. Under the designation **Pz 61** these were delivered to the Swiss army between 1965 and 1966.

The Pz 61 was followed in production by the **Pz 68**, which had a number of modifications including the replacement of the co-axial 20-mm cannon by a 7.5-mm (0.295-in) machine-gun; other alterations include a gun stabilization system, wider tracks and increased length of track in contact with the ground. A total of 170 Pz 68s was built between 1971 and 1974; these were followed by 50 **Pz 68 Mk 2** (delivered in 1977), 110 **Pz 68 Mk 3** (delivered in 1978/79) and finally 60 **Pz 68 Mk 4** which were delivered between 1981 and 1982.

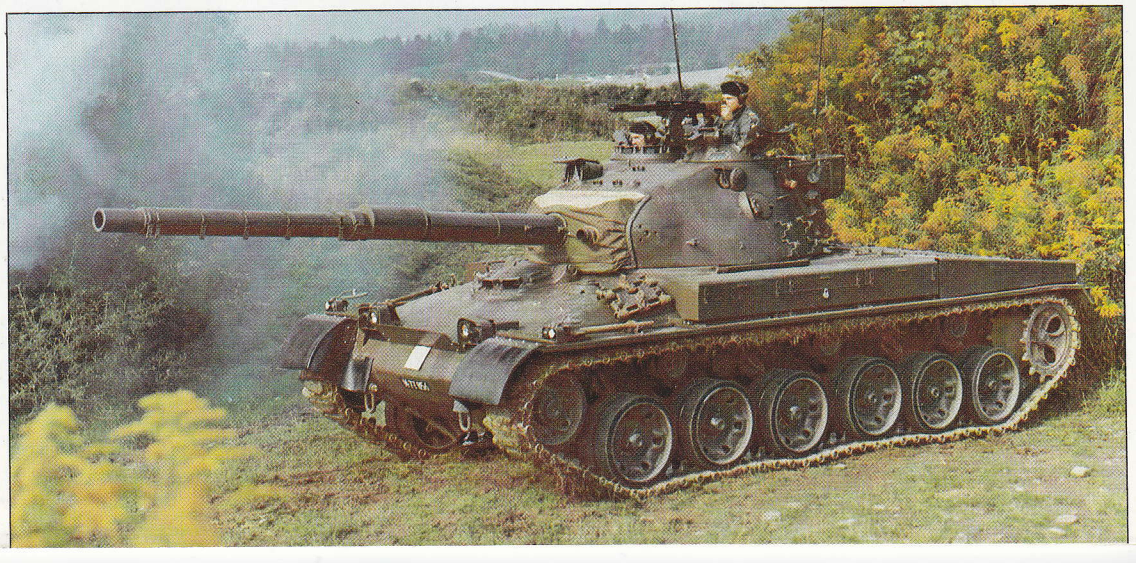
The layout of the Pz 68 is conventional, with the driver at the front, turret in the centre, and engine and transmission at the rear. The turret is of cast steel construction with the commander and gunner on the right and the loader on the left. Unlike many tanks, in the Pz 68 the loader operates the anti-aircraft machine-gun, so allowing the tank commander to carry out his proper role of commanding the tank. The main armament consists of a 105-mm gun with an elevation of +21° and a depression of −10°; there is a 7.5-mm (0.295-in) co-axial machine-gun and a similar anti-aircraft machine-gun. Three smoke dischargers are mounted on each side of the turret and more recently most vehicles have been fitted with two Bofors Lyran launchers on the turret roof to provide target illumination at night.

Using the chassis of the Pz 68 several variants have been developed including the **Entpannungspanzer 68** ARV, the **Brückenpanzer 68** armoured bridgelayer and a target tank. Prototypes of an anti-aircraft tank (armed with twin 35-mm cannon) and a 155-mm self-propelled gun were built, but these were not placed in production. The ARV is fitted with a stabilizer/dozer blade at the front of the hull, an A-frame which can lift 15 tonnes and an hydraulic winch with a capacity of 25 tonnes increasable to 75 tonnes with the aid of snatch blocks.

The Pz 61 and Pz 68 have not been among the more successful of post-war designs, and in 1979 a report stated that there were some 50 faults in the Pz 68; some of these were quite serious, including short track life, gun not staying on the target and cracking fuel tanks.

Specification

Crew: 4
Weight: 39.7 tonnes
Engine: MTU 8-cylinder diesel developing 660 hp (492 kW)
Dimensions: length (with gun forward) 9.49 m (31 ft 1⅔ in); length (hull) 6.98 m (22 ft 11 in); width 3.14 m (10 ft 3⅔ in); height (including AA MG) 2.88 m (9 ft 5½ in)
Performance: maximum road speed 55 km/h (34 mph); maximum range, road 350 km (217 miles); fording 1.1 m (3 ft 7⅓ in); gradient 60%; vertical obstacle 1 m (3 ft 3⅓ in); trench 2.6 m (8 ft 6⅓ in)



Pz 68 MBT of the Swiss army showing the thermal sleeve fitted to the 105-mm L7 gun. Switzerland is now to make the German Leopard 2 under licence.

RAF Strike Command

Flying from RAF Lossiemouth on maritime strike duties, the Buccaneer S.Mk 2Bs of No. 208 Sqn, along with those of No. 12 Sqn, will fly until replaced by Tornados in 1990.

Airborne defence

Defensive forces, administered by No. 11 Group from its headquarters at Stanmore, are also on the threshold of a far-reaching programme of enhancement which will see the BAe Lightning and part of the McDonnell Douglas Phantom force replaced by Tornado F.Mk 2s. Developed as a long-range interceptor specifically for RAF needs, this variant of the Tornado is equipped with AI.Mk 24 Foxhunter radar, four Sky Flash and two Sidewinder AAMs, plus a 27-mm Mauser cannon.

The RAF will take delivery of the first of 165 Tornado F.Mk.2s in 1985, their first task being to replace two squadrons of Lightnings. Four Phantom units will be retained for as long as their airframe condition permits after the Tornado F.Mk 2 becomes operational, although two of them are expected to be the squadrons in RAF Germany, which are not scheduled to receive Tornado F.Mk 2s. When 15 ex-US Marine Corps F-4J Phantoms are delivered, having been ordered in late 1982 to replace an air defence squadron on the Falklands, six Phantom squadrons will be assigned to UK air defence pending Tornado F.Mk 2 deliveries.

Equally as important as the Tornado is the BAe Nimrod AEW.Mk 3, 11 of which are being converted with bulbous radomes at the nose and tail for airborne early warning, replacing the veteran BAe (HS) Shackleton AEW.Mk 2. Operating far from base, the Nimrod AEW.Mk 3 will act as an advance radar and control station, plotting low-level intruders such as Soviet Sukhoi 'Fencer' attack aircraft and Tupolev 'Backfire bombers, and directing Tornado F.Mk 2s on to their quarry.

As a second line of defence, No. 11 Group operates six flights of Bloodhound SAMs on England's east coast, and two RAF Regiment units of short-range Rapiers for point defence of Scottish air bases. Recently, 90 of the BAe Hawk T.Mk 1s used for weapons training have been fitted with provision for a paid of Sidewinders, allowing them to act as a back-up interceptor force.

No. 29 Sqn's Phantoms usually operate from RAF Coningsby on UK air defence, but after the Falklands conflict of 1982 they moved to Stanley. The squadron is now No. 23 Sqn.

RAF Strike Command's Nimrod MR.Mk 2s operate from Kinloss and St Mawgan, with one of their major maritime patrol duties being protection of the North Sea oilfields.

Eyes over the sea

Augmenting the Royal Navy in its role of defending the UK's water, No. 18 Group, with its headquarters at Northwood, Middlesex, operates Strike Command's maritime patrol assets, in the form of four squadrons of Nimrods. Almost all of these aircraft have now been converted to Nimrod MR.Mk 2 standard with advanced sensor systems for detecting potentially hostile ships and submarines, their Falklands exploits having provided them with additional weaponry such as self-defence Sidewinders and Harpoon anti-ship missiles.

The more normal weapon against surface targets, however, is the BAe Buccaneer S.Mk 2B and its Martel missile. Two squadrons assigned to this role will shortly receive the more potent Sea Eagle and improved avionics to keep them in the front line until the end of this decade.

Other forces in No. 18 Group include detachments of Westland Sea King and Westland Wessex helicopters for search and rescue (SAR), and two BAe (BAC) Canberra squadrons. The latter provide target facilities to all three services, additionally functioning in the visual maritime reconnaissance role in time of war.

Outside this three-group structure, there were until recently only a handful of aircraft operating with Strike Command abroad: a Wessex squadron in both Cyprus and Hong Kong, and a flight of Harriers and Pumas in Belize, Central America. In the aftermath of the Falklands war, the need to garrison the islands has resulted in expansion of the RAF's overseas presence for the first time in many years, and Port Stanley is now host to Phantoms, Harriers, Chinooks and Sea Kings.

The events which brought these aircraft to the South Atlantic were an unambiguous demonstration of Strike Command's primary duty: swift and effective reaction to forces threatening the UK, its interests and its friends. The considerable improvements in potential now at hand will ensure that this capability is maintained up to the end of the century.

No. 11 Group (HQ: Stanmore, Middlesex)

No. 5	Lightning F.Mk 6	Binbrook	air defence
No. 8	Nimrod AEW.Mk 3	Waddington	airborne early warning
No. 11	Lightning F.Mk 6	Binbrook	air defence
No. 25	Bloodhound 2 SAM	Barkston Heath Wyton Wattisham	air defence
No. 29	Phantom FGR.Mk 2	Coningsby	air defence
No. 43	Phantom FG.Mk 1	Leuchars	air defence
No. 56	Phantom FGR.Mk 2	Wattisham	air defence
No. 85	Bloodhound 2 SAM	West Raynham North Coates Bawdsey	air defence
No. 111	Phantom FG.Mk 1	Leuchars	air defence
No. 228 OCU	Phantom FGR.Mk 2	Coningsby	crew conversion
LTF	Lightning F.Mk 3/T.Mk 5/ F.Mk 6	Binbrook	pilot conversion
LAF	Lightning F.Mk 3/T.Mk 5/ F.Mk 6	Binbrook	reserve pool
No. 1 TWU	Hawk T.Mk 1 Hunter F.Mk 6A/T.Mk 7/ FGA.Mk 9	Brawdy	weapons training (comprises Nos 79 and 234 Squadrons)
No. 2 TWU	Hawk T.Mk 1	Chivenor	weapons training (comprises Nos 63 and 151 Squadrons)
Planned additions			
—	F-4J Phantom	—	airborne early warning air defence

No. 18 Group (HQ: Northwood, Middlesex)

No. 12	Buccaneer S.Mk 2B	Lossiemouth	maritime strike
No. 22	Wessex HC.Mk 2	Finningley, Chivenor, Leuchars, Valley, Leconfield, Manston	SAR
No. 42	Nimrod MR.Mk 1/MR.Mk 2	St Mawgan	maritime patrol
No. 100	Canberra B.Mk 2/PR.Mk 7/ E.Mk 15/TT.Mk 18	Wyton	target facilities
No. 120	Nimrod MR.Mk 2	Kinloss	maritime patrol
No. 201	Nimrod MR.Mk 2	Kinloss	maritime patrol
No. 202	Sea King HAR.Mk 3	Finningley, Boulmer, Brawdy, Lossiemouth, Stanley (Falkland Islands)	SAR
No. 206	Nimrod MR.Mk 2	Kinloss	maritime patrol
No. 208	Buccaneer S.Mk 2B	Lossiemouth	maritime strike
No. 360	Canberra T.Mk 17	Wyton	target facilities
No. 231 OCU	Canberra B.Mk 2/T.Mk 4	Wyton	crew conversion
No. 236 OCU	Nimrod MR.Mk 2	St Mawgan	crew conversion
No. 237 OCU	Buccaneer S.Mk 2B Hunter T.Mk 7A	Honington	crew conversion
No. 1 PRU	Canberra PR.Mk 9	Wyton	photo-survey
SARTS	Wessex HC.Mk 2	Valley	crew conversion

Abbreviations

ATF	Andover Training Flight
ChinDet	Chinook Detachment
HarDet	Harrier Detachment
LAF	Lightning Augmentation Flight
LTF	Lightning Training Flight
OCU	Operational Conversion Unit
PRU	Photo Reconnaissance Unit
SARTS	SAR Training Squadron
TOEU	Tornado Operational Evaluation Unit
TTTE	Trinational Tornado Training Establishment
TWCU	Tornado Weapons Conversion Unit
TWU	Tactical Weapons Unit

Direct-reporting units

No. 23	Phantom FGR.Mk 2	Stanley, FI	air defence
No. 28	Wessex HC.Mk 2	Sek Kong, Hong Kong	support and SAR
No. 84	Wessex HC.Mk 2	Akrotiri, Cyprus	UN support and SAR
No. 1417 Flt	Harrier GR.Mk 3	Belize City, Belize	close support
ChinDet	Chinook HC.Mk 1	Stanley, FI	tactical transport
HarDet	Harrier GR.Mk 3	Stanley, FI	close support
TOEU	Tornado GR.Mk 1	Boscombe Down	operational evaluation